

STANDARDS DEVELOPMENT BRANCH OMOE

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**PROPOSED GUIDELINES
FOR THE CLEAN-UP
OF CONTAMINATED SITES
IN ONTARIO**

JULY 1994

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MOE



Ontario

**Ministry of
Environment
and Energy**

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**PROPOSED GUIDELINE FOR THE CLEAN-UP
OF CONTAMINATED SITES IN ONTARIO**

STANDARDS DEVELOPMENT BRANCH
135 ST. CLAIR AVENUE WEST
TORONTO, ONTARIO M4V 1P5

JULY 1994



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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Purpose and Application	1
2.0	GUIDELINE PRINCIPLES AND CLEAN-UP APPROACHES	3
2.1	Clean-up Approaches	3
2.2	Development of Generic Criteria	4
2.3	Application of Generic Criteria	5
2.3.2	Land-use Designation	5
2.3.3	Groundwater Protection	6
2.3.4	Full and Stratified Depth Soil Clean-up	7
3.0	RELATIONSHIPS TO OTHER GUIDELINES AND LEGISLATION	8
4.0	MOEE ADMINISTRATION OF THE GUIDELINE	8
5.0	SITE ASSESSMENT AND CLEAN-UP PROCESS	9
5.1	STEP 1 - SITE ASSESSMENT	9
5.1.1	Phase 1 Environmental Site Assessment (ESA)	9
5.1.2	Public Consultation	10
5.2	STEP 2 - SAMPLING AND ANALYSIS	10
5.2.1	Phase 2 Environmental Site Assessment (ESA)	11
5.3	STEP 3 - SITE CLEAN-UP	12
5.3.1	Site Clean-up Plan	12
5.3.2	MOEE Permits and Approvals	14
5.4	STEP 4 - COMPLETION OF CLEAN-UP	15
5.4.1	Notice of Clean-up/Registration	16
5.4.2	Withdrawal of Certificate of Prohibition	17
6.0	GUIDANCE ON SENSITIVE SITES	18
7.0	GUIDANCE ON DEVELOPING OTHER CLEAN-UP CRITERIA	19
7.1	Develop New Generic Criteria	19
7.2	Criteria from Another Jurisdiction	19
7.3	Use of Background Criteria	20
7.4	Site Specific Risk Assessment (SSRA)	20
8.0	PUBLIC CONSULTATION	23
	GLOSSARY	24
	BIBLIOGRAPHY	26
	APPENDIX 1 : RELATED LEGISLATION AND REGULATIONS	27
	APPENDIX 2 : GENERIC CLEAN-UP CRITERIA - TABLES A TO F	32
	APPENDIX 3 : GUIDANCE ON CRITERIA EXCEEDANCES	63
	APPENDIX 4 : COMPLETION OF CLEAN-UP DOCUMENTATION	65

1.0 INTRODUCTION

1.1 Purpose and Application

This document describes an approach for assessing and cleaning up contaminated sites in Ontario. Clean-up criteria are provided for generic use, while flexibility for developing and using site specific clean-up criteria is provided. There are three companion documents for this guideline, which are:

1. "Guidance on Sampling and Analytical Methods for Site Clean-ups in Ontario" (draft May 1994),
2. "Rationale For the Development and Application of Generic Soil, Ground Water, and Sediment Criteria For Clean-up of Contaminated Sites" (draft May 1994)
3. "Guidance For the Use of Risk Assessments in Site Clean-ups in Ontario" (draft May 1994),

This guideline may be used when restoration of soil, ground water, or sediment quality in the natural environment is required, or when provincial, municipal, and private properties are being developed, re-developed, or re-used, and where there is an adverse effect, or the potential for an adverse effect from soil, ground water or sediment conditions. This guideline may be used to deal with historical or present day pollutants or contaminants, which have been discharged to, or are present in soil, ground water or sediment in the natural environment.

The Ministry of the Environment and Energy (MOEE) is mandated to enforce the following legislation, and regulations pursuant to this legislation:

- ▷ Environmental Protection Act (R.S.O. 1990) (EPA)
- ▷ Ontario Water Resources Act (R.S.O. 1990) (OWRA)
- ▷ Pesticides Act (R.S.O. 1990) (PA)
- ▷ Environmental Assessment Act (R.S.O. 1990) (EAA)

The EPA defines "natural environment" as the air, land and water, or any combination or part thereof, of the Province of Ontario. Criteria provided with this guideline have been established to be protective of the natural environment by establishing levels for chemical parameters in soil, sediments, and ground waters. Ministry standards and/or criteria for chemical parameters in air and surface waters are also available from MOEE.

The PA defines "environment" as the natural environment, a building, structure, machine and vehicle, or any of them. The requirements for the management of asbestos wastes, PCB's and pesticides, often encountered within buildings, are also available from the Ministry. (referenced in Appendix 1)

The MOEE, through legislative authority, can require that a property owner use this guideline for site clean-up. For example, if there is, or there is likely, cause for an adverse environmental effect from the presence or discharge of a contaminant or pollutant as defined by the EPA (Section 1, Section 91), the MOEE can Order that a site be restored in a manner consistent with this guideline.

The MOEE may also use this guideline, or recommend use of this guideline when asked to provide comments or advice to other Ministries, agencies or individuals on matters related to site assessment and clean-up and restoration of the natural environment.

This guideline may be used or referenced by agencies other than the MOEE. A property owner may be required to use this guideline under the direction of another authority, such as a municipality, as a condition of a municipal permit, for approval of a plan of subdivision, or as a condition of re-zoning. A property owner may also follow this guideline to assess or clean-up the property for re-use or any other purpose.

Except to the extent the guideline is made applicable by an MOEE Order or Approval, the guideline is not intended to be applied to the closure of:

- * approved waste disposal sites or facilities,
- * facilities or sites with closure conditions specified in fulfilment of the requirements of the Mining Act or an MOEE Certificate of Approval,
- * facilities or sites required to meet terms and conditions attached to an Environmental Assessment Act Exemption Order or Approval.

Unless otherwise designated, clean-ups on Federal government property or areas under Federal government jurisdiction are subject to Federal legislation, regulations and standards.

This guideline provides an outline of the activities in the four steps listed below. Additional discussion of each of these steps is provided in Section 5.0.

Step 1 Site assessments (Phase 1 Environmental Site Assessment -ESA) undertaken to determine the potential for presence of contamination on site.

- Step 2 Site investigations and sampling (Phase 2 ESA) undertaken to determine the presence and extent of contamination, and determine the need for clean-up;
- Step 3 Site clean-up planning and implementation to remediate any contamination found on property;
- Step 4 Site clean-up notification to MOEE.

This guideline and the noted companion documents replace both the "Guidelines for the Decommissioning and Clean-up of Sites in Ontario" published by the former Ministry of the Environment (MOE) in 1989, and the "Interim Guideline for the Assessment and Management of Petroleum Contaminated Sites in Ontario" released by MOEE in August 1993.

2.0 GUIDELINE PRINCIPLES AND CLEAN-UP APPROACHES

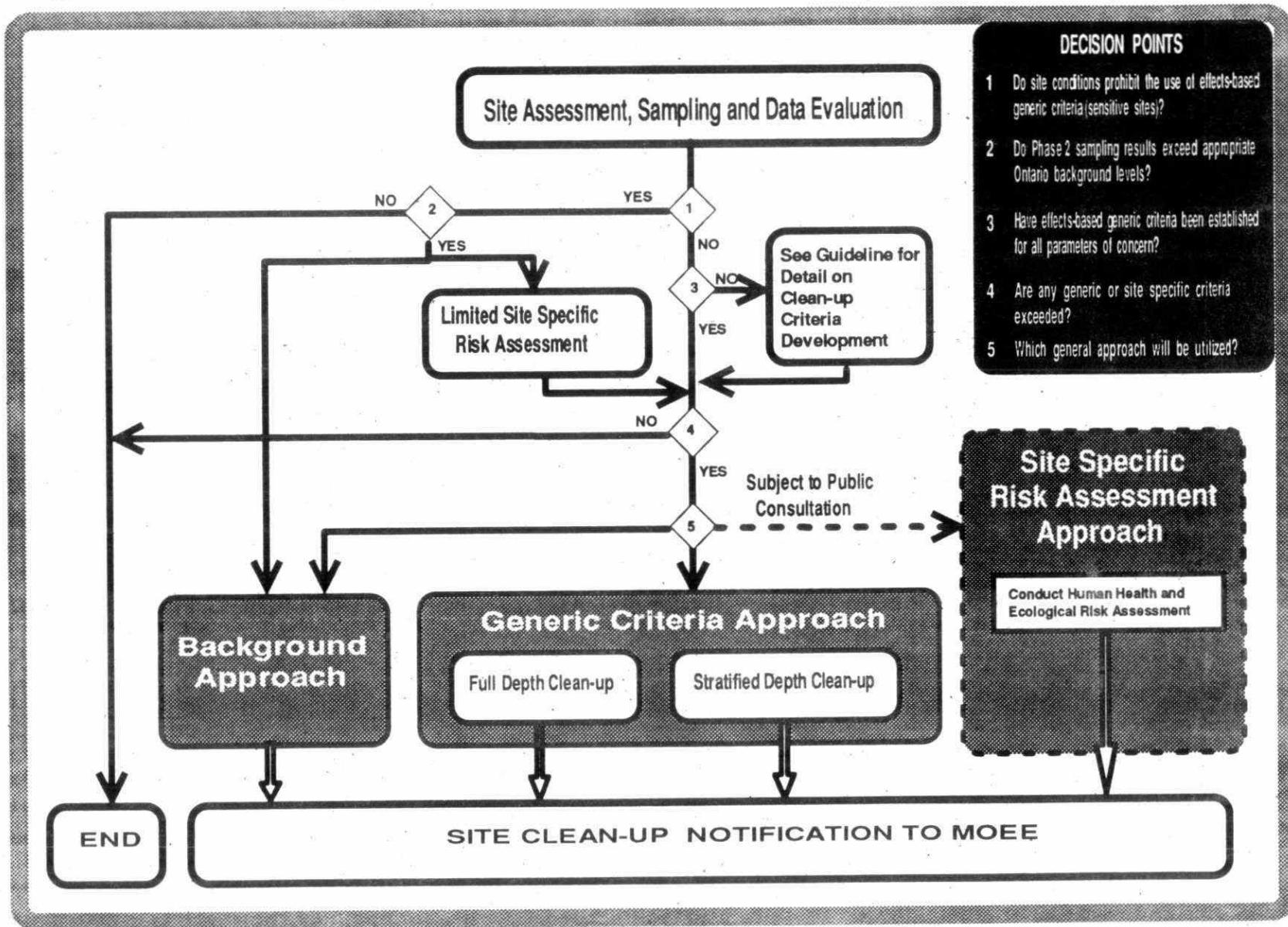
Five principles have been used in the development of this guideline to ensure a consistent and equitable process is available to those involved with, and affected by site management and clean-up activities. These principles are described below.

- This guideline is consistent with and should not conflict with any of the requirements of the Environmental Protection Act, Ontario Water Resources Act, Pesticides Act, Environmental Assessment Act or any other Ontario statute.
- This guideline was developed to ensure protection of human health and the natural environment from potential adverse effects associated with exposure to contaminated soil, sediment, and ground water.
- The public has a right to be kept informed of the site clean-up process.
- Action by the MOEE related to this guideline and/or the issuance of written statements acknowledging site clean-up, is not intended to release responsible parties from liability under environmental or common law.
- It is the responsibility of the owner, occupant of a property, or other responsible person(s) to ensure all clean-up activities comply with all relevant Federal, Provincial, and Municipal legislation/policies.

2.1 CLEAN-UP APPROACHES

Figure 2.1 provides an outline of the process for determining the clean-up approach for contaminated sites. The clean-up approaches

Fig. 2.1 Selecting the Clean-up Approach



are: Background, Generic Criteria, and Site Specific Risk Assessment (SSRA).

The Background approach can be utilized for any site. A Table of background clean-up criteria are provided in Table F (Appendix 2). Where background criteria are not provided, guidance is provided on how to develop new background criteria (section 7.3).

The use of SSRA is intended for "sensitive sites" (described in section 6.0). For sensitive sites, a limited SSRA can be undertaken to replace specific generic criteria that have been found not to provide sufficient protection for the site. SSRA can also be used at the property owner's discretion provided specific conditions are met (see section 7.4).

The following sections describe the use of the generic criteria clean-up approach. The generic approach is likely to be the most common clean-up to be undertaken.

2.2 DEVELOPMENT OF GENERIC CRITERIA

An extensive set of generic clean-up criteria (117) have been developed for generic use in cleaning up contaminated sites. These criteria are contained in Tables A to D of Appendix 2. A detailed description of the rationale that was used to develop these generic criteria is available in the MOEE document entitled "Rationale For the Development and Application of Generic Soil, Ground Water, and Sediment Criteria For Clean-up of Contaminated Sites" (draft May 1994). The following provides a brief overview of the fundamental principles that were applied in the criteria development process.

The protection of human health and the natural environment is addressed through the provision of effects-based criteria for soil, ground water, and sediment quality. In developing effects-based criteria, potential receptors and exposure pathways for typical land uses are considered. Receptors may be from human (children or adults) or ecological populations including life forms such as plants, wildlife, or birds. Pathways are the routes by which the chemicals in soil, ground water, or sediment come into contact with the receptors. By providing protection for sensitive potential receptors of the population, other receptors will also be protected.

In developing and analyzing pathway exposure scenarios , a series of assumptions are made relating the frequency, duration, and intensity of exposure to a receptor, to allow estimation of the potential for an adverse effect. Physical and chemical characteristics of contaminants are also considered in estimating the environmental fate and potential for adverse effects from exposure to the contaminant. The exposure assumptions are conservative in that scenarios which are likely to produce a

potential impact to sensitive receptors are utilized. Generic criteria limits are set at levels which reduce the potential for adverse effects under these exposure conditions.

The generic clean-up criteria in this guideline are categorized by commonly land use designations (agricultural, parkland, residential, commercial and industrial). These land use designations represent many different types of potential exposure scenarios and potential receptor characteristics. Criteria which apply to groups of land use types reflect similarity in the potential exposure patterns and potential receptor characteristics for those land use types. The most sensitive potential receptor, and the exposure scenario with the highest potential for impact for each land use category are used to establish the generic criteria limits.

2.3 APPLICATION OF THE GENERIC CRITERIA

To determine the applicability of using generic criteria, there are four questions to be answered:

1. Is this a "sensitive" site ?
2. What is the intended land use ?
3. What is the level of ground water protection (potable or non-potable) required?
4. What type of clean-up will be utilized (Full or Stratified Depth) ?

The terminology associated with each of these questions is defined in the following four sections.

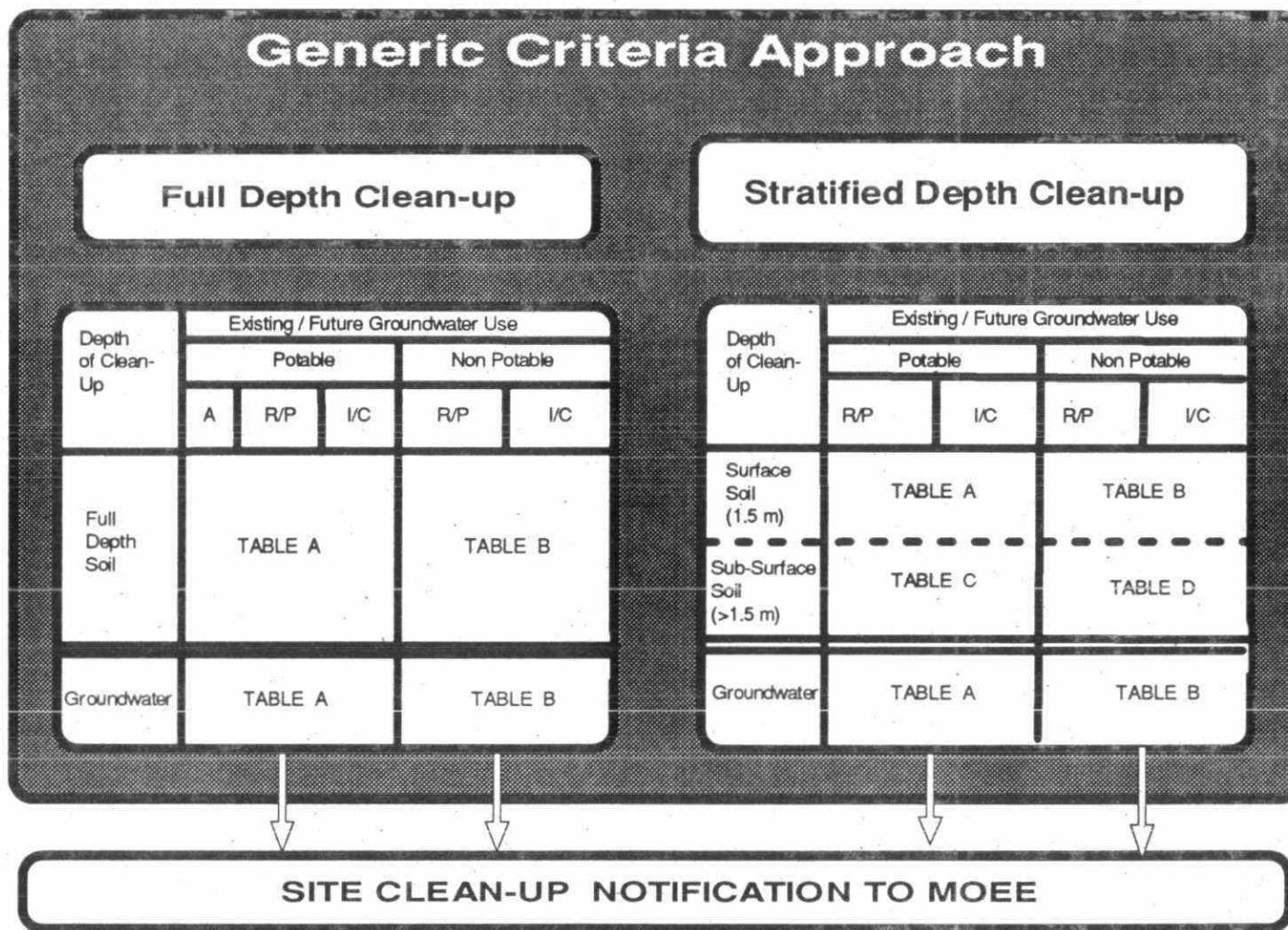
2.3.1 Sensitive Sites

The soil, ground water and sediment clean-up criteria presented in Tables A to D of Appendix 2 provide protection against potential for adverse effects in a variety of exposure scenarios. There may, however, be situations where physical and chemical site characteristics are very different from the conditions and assumptions considered in developing the generic criteria. There may also be unique, highly sensitive receptors, at or in the vicinity of a site, which have not been considered in the development of the generic criteria. When such sensitive site conditions exist, the generic criteria may be inappropriate for use. Section 6.0 provides guidance on dealing with sensitive sites.

2.3.2 Land Use Designation

Land uses, commonly designated as agricultural, residential, parkland, industrial and commercial, have been grouped in the

Fig. 2.2 Selection of Soil and Groundwater Criteria



A = Agricultural; R/P = Residential/Parkland; I/C = Industrial/Commercial Land Use

following three categories:

- Agricultural (A)
- Residential/Parkland (R/P)
- Industrial/Commercial (I/C)

Institutional uses such as schools, daycare centres, and hospitals are included in the Residential/Parkland (R/P) category. Any portion of a commercial site which includes residential occupancy, a playground, or a daycare are also considered to be part of the Residential/Parkland category. This is consistent with the conservative nature of the exposure scenarios considered in criteria development.

Industrial/Commercial sites which are being taken out of service and mothballed, should be restored to levels which correspond with the appropriate land use designation. If these sites are not restored, measures should be put in place to restrict public access and to ensure that environmental conditions at the site do not degrade. The owner(s) may consider implementing one or more of the following measures in restricting access to the site:

- i) warning signs
- ii) fencing
- iii) security and/or surveillance maintained

It is the responsibility of the site owner(s) to ensure that site conditions comply with applicable statutes and regulations.

2.3.3 Ground Water Protection

Criteria are provided for the restoration of impaired ground water to potable (Table A) and non-potable (Table B) conditions. Restoration of ground water quality to potable levels ensures use of ground water as drinking water, provides protection against potential exposure from vapours which may originate from chemicals in ground water, and provides protection for aquatic receptors in adjacent surface waters which the ground water will enter.

Restoration of ground water quality to the non-potable level ensures protection against potential exposure from vapours coming from chemicals in ground water, and protection for aquatic receptors in adjacent surface waters fed by ground water. Restoration to the non-potable level does not render the ground water suitable for consumption.

Justification for, and a rationale for using the non-potable level will be required when the "Notice of Clean-up" noted in Section 5.4.1 is presented to the Ministry.

Ground water restoration to non-potable criteria may be considered only when both of the following conditions are met:

- i) area is served by a communal or municipal drinking water supply;
- ii) present or future surface water or ground water sources of drinking water will not be adversely affected, including water for agricultural and aquaculture uses;

2.3.4 Full Depth and Stratified Depth Soil Clean-up

Two options for a generic clean-up approach are available when soil contamination extends to depths greater than 1.5 m. Restoration of soil quality to the full extent of the contamination may be undertaken. The criteria for use are provided in Table A and B. This is referred to as a Full Depth Clean-up.

Alternatively, surface soil quality ($<= 1.5$ m) may be restored to meet levels outlined in Table A or B, and sub-surface soil quality (> 1.5 m) restored to levels outlined in Table C or D. This is referred to as a Stratified Depth Clean-up. Figure 2.2 shows how to select the appropriate Table for selecting generic criteria.

The criteria for these two scenarios were developed by considering appropriate exposure pathways, physical and chemical properties of the substances, environmental fate characteristics, and appropriate frequency and duration of exposure of receptors in the land use scenarios previously described.

The potential for a chemical to migrate from contaminated soil to ground water was also considered in the development of soil criteria. Leaching potential was calculated, and the chemical concentrations in the soil were established such that the required level of ground water protection is provided.

- NOTE:
1. A Stratified Depth Clean-up requires that sub-surface soils remain at depth. If the sub-surface soils are brought to and left at surface, further clean-up will be required.
 2. Some sub-surface soil criteria in Tables C and D are identical to the surface criteria in Tables A and B - these sub-surface criteria are denoted with an asterisk (*). If the sub-surface contaminants of concern are all denoted with **, the clean-up is effectively considered a Full Depth Clean-up.

3.0 RELATIONSHIPS TO OTHER GUIDELINES AND LEGISLATION

When a site has been assessed and investigated, a variety of options for management or clean-up may be evaluated. The assessment of the site and the evaluation of remedial options may involve other Provincial, Federal and Municipal guidelines and legislation. A list of related legislation and regulations is provided in Appendix 1. The most commonly encountered are listed below. These lists are not meant to be exhaustive, but merely to serve as reference information.

Federal

- Transportation of Dangerous Goods Act (PCBs, Asbestos, Hazardous materials)
- Fisheries Act

Provincial

- Gasoline Handling Act (MCCR - underground fuel storage tanks)
- Occupational Health and Safety Act (MOL - Asbestos removal, WHIMIS)
- Health Protection and Promotion Act (MOH)

Municipal

- Municipal Act (demolition, land use planning/approval, sewer use and other local by-laws)

This guideline may be referred to in regulations, guidelines or policies developed by other Provincial, Federal and Municipal agencies. Reference to, or use of this document by other agencies should not imply MOEE involvement or participation in any other agency process or activity. The responsibility for monitoring or ensuring completion of activities required by other agencies remains with the respective agency. This does not preclude situations where MOEE and another agency have an agreement which defines the role and relationship of the respective agencies.

4.0 MOEE ADMINISTRATION OF THE GUIDELINE

District Offices of the Regional Operations Division provide program delivery services for the MOEE and questions pertaining to the operational components of the guideline should be directed to the District Offices. Figure 4.1 is a map of the Regional and District Office locations and boundaries, while Table 4.1 provides a list of the addresses and telephone numbers for the

District Offices. [not included in consultation document, but will be included in final document]

This guideline recommends that reports which summarise the extent of site investigations, the details of the clean-up plan, and associated conclusions and recommendations provided at the end of each step of the process be retained by the property owner. The report(s), and submission of report(s) to the MOEE, is not a required function of the process outlined in this guideline except as noted in the subsequent sections.

5.0 SITE ASSESSMENT AND CLEAN-UP PROCESS

An outline of the site assessment and clean-up process is illustrated in Figure 5.1. This outline is not meant to be a complete description of all activities, and the steps and types of activities at each step will necessarily vary with site conditions and remedial requirements. The activities, findings, decisions and recommendations at each step should be fully documented in reports to be retained by the site owner.

5.1 STEP 1 - SITE ASSESSMENT

The first step of the site assessment clean-up process involves the systematic gathering of information to identify actual or potential contamination or sources of contamination.

5.1.1 Phase 1 Environmental Site Assessment (ESA)

A Phase 1 Environmental Site Assessment (ESA - not to be confused with an Environmental Audit which may deal with regulatory compliance or other issues) may be undertaken as part of Step 1.

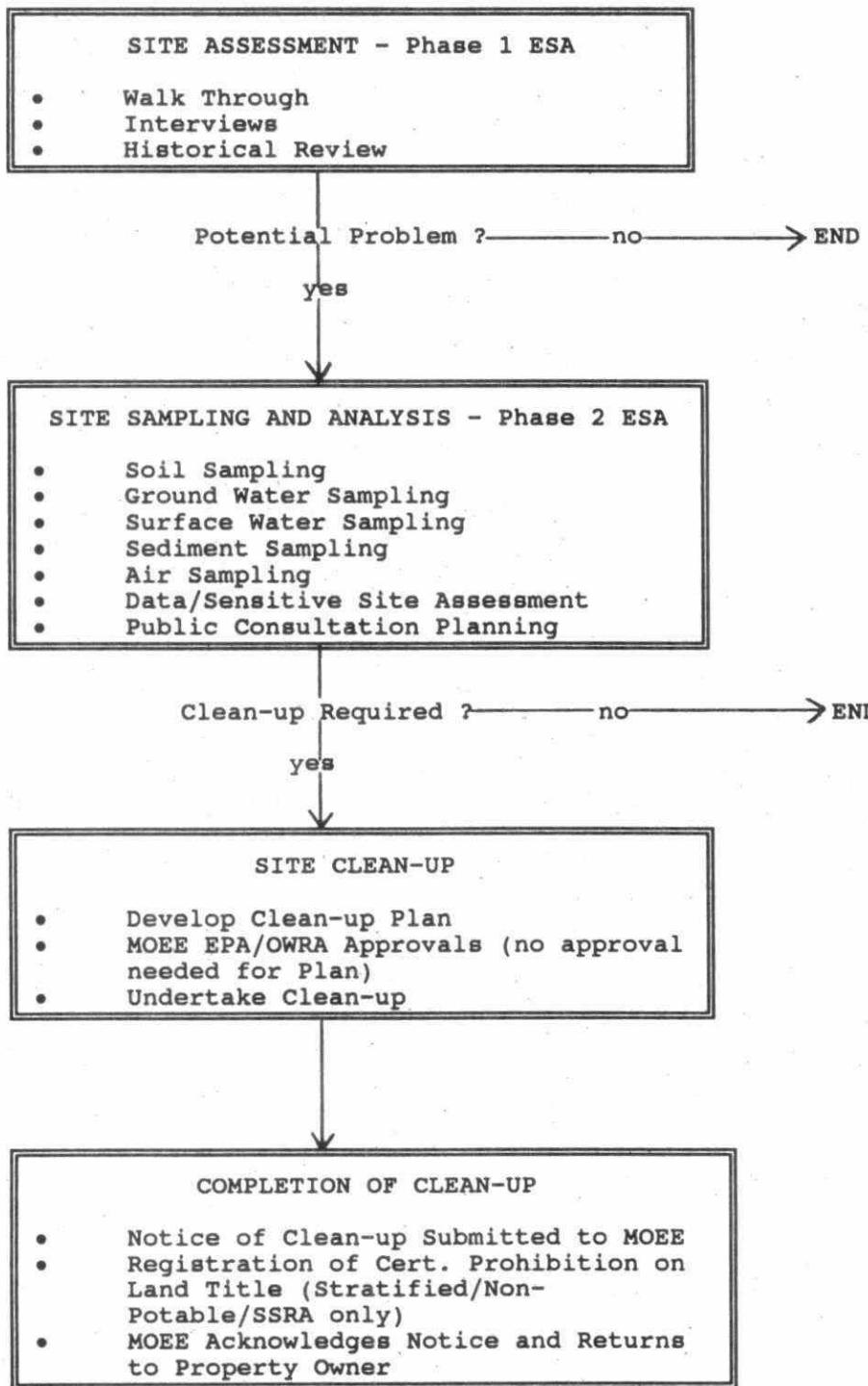
A reference list of detailed guidance manuals on Phase 1 ESAs and a brief overview of these documents is provided in "Guidance on Sampling and Analytical Methods for Site Clean-ups in Ontario" (draft May 1994).

A Phase 1 ESA may include, but is not limited to the following activities:

- reviews of property histories through the use of air photographs, insurance maps, land title searches, regulatory agency records, previous ESA reports, company records, topographic maps etc.
- interviews with present and past site occupants, government officials (provincial and municipal), neighbours etc.

FIGURE 5.1 OVERVIEW OF CLEAN-UP PROCESS

STEP 1



site visits to inspect raw and finished materials handling, waste management and storage practices, investigate for presence of polychlorinated biphenyl (PCBs), or asbestos containing materials (ACM), examine building heating and cooling systems and fuel storage locations, and to verify any of the findings or discrepancies noted in the review of historical information or interview process.

Phase 1 ESAs do not usually involve the collection and analysis of samples. Geomagnetic or geophysical surveys or limited sampling programs may be completed during Phase 1 to provide information needed to direct further sampling programs.

A Phase 1 ESA will provide an indication of the need and type of sampling and analysis that is required, or may confirm that the site (soil, sediment, ground/surface water) and\or building(s) are free of contamination and that further investigation is not necessary. If sampling is required, the findings of the Phase 1 ESA should provide an indication of the chemical parameters in soil, ground water or sediment to be considered for analysis in Step 2. A report documenting the findings of the Phase 1 ESA should be retained by the property owner.

If there is reason to suspect the presence of contamination, the property owner/consultant should proceed to Step 2 with further investigation.

NOTE: If the discharge of a contaminant to the environment or natural environment is causing, or is likely to cause an adverse effect, the local MOEE District Office must be notified.

5.1.2. Public Consultation

MOEE encourages property owners to formulate and implement a communication plan to provide information to the public during the clean-up process. Site neighbours (or neighbourhoods) to be affected at later stages in the clean-up process should be contacted at the outset of the process and communication maintained throughout the process as necessary. Section 8.0 provides further discussion on public notification and consultation.

5.2 STEP 2 - SAMPLING AND ANALYSIS

The second step of the site assessment and clean-up process is intended to confirm and delineate the presence or absence of contamination at the site\building(s). Guidance and procedures for the collection and analysis of a variety of sample types is provided in the MOEE document "Guidance on Sampling and

Analytical Methods for Site Clean-ups in Ontario" (draft May 1994).

5.2.1 Phase 2 Environmental Site Assessment (ESA)

A Phase 2 ESA should confirm and characterize the type and extent of contamination at a site, or negate the potential for the presence of contamination. Some of the activities in a Phase 2 ESA may include:

- surface and sub-surface soil sampling, ground water and surface water sampling, soil gas sampling, sediment sampling, collection of plant samples
- above\under ground storage tank content and tightness testing, ACM sampling, PCB sampling and identification, geomagnetic or geophysical surveys
- testing of building materials for pesticide residues

A Phase 2 ESA may include a planning stage, a sampling and chemical analyses stage, and an interpretation and evaluation stage. It is important that contingency provisions be built into each stage to allow program changes as additional site information becomes available.

The type, number, and location of sampling and testing activities are site specific considerations. Samples or additional surveys are normally undertaken in areas where the Phase 1 ESA has identified the potential for contamination. The chemical parameters considered for analysis may be modified based on initial Phase 2 findings. Laboratory analytical protocols are provided in "Guidance on Sampling and Analytical Methods for Site Clean-ups in Ontario" (draft May 1994). This document also provides guidance on quality assurance\quality control protocols for field and laboratory work. Proponents are advised to pay particular attention to this guidance.

Data collected from the Phase 2 ESA should be compared to clean-up criteria for soil, sediment, and ground water from the appropriate Table in Appendix 2. This comparison will assist in estimating the extent of clean-up required.

Appendix 3 contains guidance on interpreting sample exceedances for soil, ground water and sediment which exceed the criteria limits specified in the Tables provided in Appendix 2.

When pesticides are of concern, property owners/consultants should recognize that Tables A to D do not provide an inclusive list, and there may be a need for analysis of pesticide parameters not listed but which may be present (as indicated from

the Phase 1 ESA). Analytical results should be carefully interpreted, since the application rates for pesticides are often much higher than the clean-up levels in Tables A to D, and decrease with time as chemical degradation occurs. Property owners/consultants are advised to contact the Regional Pesticide Officers for additional information as required.

The investigations, results, conclusions and recommendations of the Phase 2 ESA should be documented in a report for retention by the site owner. If the Phase 2 ESA determines that the site does not exceed any criteria for a Full Depth Clean-up/Potable (Table A criteria), the clean-up process is complete and no further action is required.

If the Phase 2 ESA shows that the site does not meet the requirements of Table A but does meet the requirements of a Full Depth Clean-up/Non-Potable (Table B) or any Stratified Depth Clean-up, proceed to Step 4. In this case, although a clean-up was not required, a "Notice of Clean-up" is to be submitted to MOEE for land title registration purposes.

If the Phase 2 ESA shows that applicable criteria are exceeded, proceed to Step 3.

NOTE: (1) If the discharge of a contaminant to the natural environment or environment is causing or is likely to cause an adverse effect, the local MOEE District Office must be notified.

5.3 STEP 3 - SITE CLEAN-UP

Step 3 involves the development and implementation of a plan to clean-up, remediate or manage the contamination found on the site. The development of a plan can also be considered as part of the Step 2 activity, with Step 3 being implementation. Step 3 may include making application for, and receiving, MOEE approval for clean-up activities (Section 5.3.2). As noted in Section 5.2.1, public notification/consultation of the clean-up should be initiated before the clean-up begins.

5.3.1 Site Clean-up Plan

The clean-up plan deals with the contamination as identified in Step 2. The plan may include, but is not necessarily limited to:

- assessment of options for removal, storage, and/or treatment of contaminated material
- treatability studies/assessment of technologies
- public notification/consultation
- detailed design and implementation

- acquiring regulatory approvals/permits
- monitoring and verification sampling

In developing a clean-up plan, the following must be considered:

- Wastes destined for off site disposal must be managed in accordance with Part V of the EPA, Regulation 347 (General-Waste Management), and the Pesticides Act.
- Reuse of building material with measurable pesticide residues must comply with the requirements of the Pesticides Act.
- Subject wastes, defined by Reg. 347, require both generator registration and manifesting for off-site transportation, disposal or treatment.
- Asbestos wastes are to be managed in accordance with Section 17 of Reg. 347.
- PCB wastes, must meet Reg. 347 requirements, and must be managed in accordance with Reg. 362 (Waste Management - PCB Regulation).
- All reasonable and practicable attempts should be made to remove all solid and free-phase liquid waste products.
- It is recognized that incidental mixing of soils will occur during some clean-up activities. The intentional mixing of on-site contaminated soils with clean soils to meet clean-up objectives is not recommended or endorsed, except;
 - i) when a beneficial effect to plant growth can be demonstrated (fertility effect for essential macro and micro nutrients - a list is being developed for inclusion in the final guideline).
 - ii) when mixing occurs as part of a remedial activity such as bioremediation or soil washing.
 - iii) in limited cases where site management proposals meet the requirements outlined in Section 7.4
- The ongoing, uncontrolled release of volatile compounds to the air as part of a remedial action is not acceptable. Every effort should be made to recover volatile contaminants. If recovery is not feasible, the local MOEE District Office must be contacted.
- Ministry approval for noise, dust, and other air emissions associated with clean-up activities must be granted prior to implementation of the clean-up plan.

5.3.2 MOEE Permits and Approvals

Approval from MOEE, is required for activities related to site clean-up which involve discharges to the natural environment or environment.

Requests for Environmental Protection Act (EPA) Part V Waste Site approvals (waste processing, storage, or transfer), waste generator registration, Permits to Take Water, and PCB Director's Instructions should be provided to the District Office.

Applications for air emission approvals (EPA Section 9), Part V Waste Management System approvals (waste transport or use of mobile technologies), and Part VIII (sewage systems) approval should be provided to the Approvals Branch and a copy provided to the District Office.

MOEE may be required to consult with municipal governments, and neighbours prior to the issuance of an approval. Proponents are advised to discuss specific approval requirements, and supporting documentation requirements for applications with the District Office. Guides for some approval applications are available and may be obtained from the District Office and Approvals Branch.

Table 5.1 provides a general summary of the potential approval requirements for some site clean-up activities. Proponents should contact the local MOEE District Office, or Approvals Branch for situations noted as "Possible" in Table 5.1.

Clean-up activities on the site identified as the source of the contamination require, but may not be limited to, the following approvals:

- Section 9 (EPA) or Section 53 (OWRA) if there are emissions to air or water as a result of the clean-up activities.
- Section 34 (OWRA) if there is water taking in excess of 50,000 L\day

NOTE: A Part V (Section 27) Waste Processing Site (EPA) approval for treating contaminated soil, such that it may be reused on-site, is not required. (this is a proposed regulatory exemption that would require amendment of Regulation 347).

Treatment of contaminated soils at a site other than the generating site requires, but may not be limited to, the following approvals:

Table 5.1 MOEE APPROVALS FOR CLEAN-UP ACTIVITIES*

SITE DECOMMISSIONING/ CLEAN-UP ACTIVITY	ENVIRONMENTAL PROTECTION ACT						ONTARIO WATER RESOURCES ACT	ENVIRONMENTAL ASSESSMENT ACT ³		
	SECTION 9 AIR APPROVAL ¹	PART V		PART VIII	WASTE GENERATOR REGISTRATION	PCB O.Reg 362 ²				
		WASTE SITE	WASTE SYSTEM ¹⁰							
Excav./ processing of on-site contaminated soil/demolition	Possible	No(require reg amend)	No	No	Possible	Possible	Possible	No		
Transport of contaminated soil to approved off-site facility	No	No	Yes	No	Possible	Possible	No	No		
Establishing landfill facility for disposal of contaminated soil • haz waste/liquid • non-haz solid $\geq 40,000\text{m}^3$ $< 40,000\text{m}^3$	Possible Possible Possible	Yes ⁶ Yes ⁶ Yes ^{4,6}	Yes	No	Yes No No	Possible No No	Possible Possible Possible	Yes Yes Possible ³		
Establishing an off-site storage/transfer facility for contaminated soil • ≥ 300 tonnes per day • < 300 tonnes per day	Possible Possible	Yes ⁶ Yes ^{4,6}	Possible Possible	No No	Possible Possible	Possible Possible	Possible Possible	Yes Possible ³		
Establishing a permanent facility for treatment of contaminated soil • ≥ 200 tonnes per day ⁸ • < 200 tonnes per day ⁸	Possible Possible	Yes ⁶ Yes ^{4,6}	Possible Possible	No No	Possible Possible	Possible Possible	Possible Possible	Yes Possible ³		
Establishing a mobile facility for treatment of contaminated soil	Possible	Yes ^{5,6}	Yes	No	Possible		Possible	Possible ³		
Establishing groundwater treatment/disposal systems	Possible	Possible	Possible	Possible	Possible		Yes ⁷	Possible ³		

1 Section 9 Air Approval required for any activity discharging airborne contaminants to the natural environment.

2 O.Reg 362 Approval required for management of PCB wastes.

3 EAA applies to all provincial waste facilities unless specifically exempt; municipal waste facilities or activities as required by the municipal regulation made under the EAA; any site requiring a mandatory hearing under Part V of the EPA is also subject to the EAA; private sector waste proposals designated by the Minister; and any proposal designated by the Minister.

4 Public hearing is at Director's discretion.

5 Public hearing not required.

6 EAA approval will result in EPA Part V approval.

7 Permit to Take Water is required if pumping greater than 50,000 Litres/Day. Discharge point will dictate if OWDO, PWQO or sewer use by-law requirements are to be met.

8 This refers to 200 TPD of waste residual, not TPD of material processed

9 Includes landfarm facilities.

10 Applies only to the system (hauler) used to move the waste, not to the treatment system if non-mobile.

* This Table is a guideline for the purpose of assisting proponents on approval requirements; proponents should always confirm approval requirements with MOEE

- Part V (EPA) approval (waste processing site) if the site is used for treatment, material transfer, sorting or disposal.
- Part V (EPA) approval (waste processing system) if mobile treatment, transfer or sorting facilities are used.
- Section 9 (EPA) or Section 53 (OWRA) if there are emissions to air or water as a result of the treatment activities.
- Section 34 (OWRA) if there is water taking in excess of 50,000 L\day

5.4 STEP 4 - COMPLETION OF CLEAN-UP

The final step in this process is the completion step. If necessary, samples should be taken and analysed to verify that the clean-up has encompassed the area of contamination, and that site conditions comply with the appropriate guideline criteria levels. This is usually done during Step 3, the implementation of the clean-up plan; however, the situation may dictate that this task is performed as a separate step.

For situations where site management measures are used, the installation and operation of the measures or site controls should be confirmed as necessary.

In all cases where a clean-up has been undertaken, or where site management controls have been used, a "Notice of Clean-up" is to be provided to the MOEE District Office to serve as a record of this step in the process.

Responsibility rests with property owners and their consultants to design, carry out and substantiate clean-ups in accordance with the guideline. Currently there are no standard qualifications for environmental consultants. In the absence of standard qualifications and accreditation for "environmental consultants", final reports on site assessment and clean-up, as well as the "Notice of Clean-up" specified in the following section are to be certified by a professional engineer designated as a Professional Engineer under the Professional Engineers Act of Ontario.

[Other professional associations which can demonstrate to MOEE comparable self-regulation can be given the same recognition in the final guideline. The association must agree to enter into an agreement with MOEE to ensure minimum qualifications, reporting/disciplinary actions, and a code of practise/ethics are established and enforced].

5.4.1 Notice of Clean-up/Registration

Step 4 involves submitting a completed and signed "Notice of Clean-up" (hereafter referred to as "Notice") to the local MOEE District Office. This form is provided in Appendix 4 and may be copied for use. The Notice has provisions for MOEE to acknowledge receipt to the property owner.

Two original copies of the Notice are to be signed by both the site owner (or delegated authority) and a Professional Engineer (or a member from an association/body recognized by MOEE) involved in overseeing the clean-up activities. These Notices are to be sent to the local MOEE District office.

When a Full Depth clean-up using Table A criteria (Potable) has been completed, and the two signed originals of the Notice are provided to the MOEE District Office, one original will be returned to the property owner, and the second will be retained by the local MOEE District Office. No registration on land title is required and the process is complete.

For situations involving Full Clean-ups using Table B (Non-Potable), any Stratified Depth clean-ups, Site Specific Risk Assessment (SSRA) clean-ups, or where site management measures are used, upon receipt of the two Notices a Director's Order (EPA, Section 18) will be issued to the property owner.

Subsection 18 (2) (EPA) states:

The Director may make an order under this section where the Director is of the opinion, upon reasonable and probable grounds,

- (a) that the nature of the undertaking or of anything on or in the property is such that if a contaminant is discharged into the natural environment from the undertaking or from or on the property, the contaminant will result or is likely to result in an effect mentioned in the definition of "contaminant" in subsection 1(1); and
- (b) that the requirements specified in the order are necessary or advisable so as,
 - (i) to prevent or reduce the risk of the discharge of the contamination into the natural environment from the undertaking or from or on the property, or
 - (ii) to prevent, decrease or eliminate an effect mentioned in the definition of "contaminant" in subsection 1(1) that will result or that is likely to result from the discharge of the contaminant into the natural environment from the undertaking or from the property.

The Notice of Clean-up serves to inform the MOEE that the consultant\owner has acknowledged that the site has been cleaned or restored to the appropriate level. Changes to the site, such as, for example, the excavation and placement of sub-surface material at surface, may result in the likelihood of an effect associated with a discharge as noted in Section 18.

The Order (draft attached in Appendix 4) will require the property owner to register a Certificate of Prohibition (attached Appendix 4) on land title pursuant to Section 197 of the EPA. Subsection 197(1) provides that:

a person who has authority under the EPA to make an order or decision affecting the real property also has authority to prohibit any person with an interest in the property from dealing with the property in any way without first giving a copy of the order of decision to each person acquiring an interest in the property as a result of the dealing.

This Prohibition will require that any person with an interest in the property be provided with a copy of the Order prior to having any dealings with the property.

NOTE: A property which has been assessed by a Phase 2 ESA which does not meet the Full Depth/Potable clean-up requirements (Table A) but which meets Table B criteria (Full or Stratified) will also be subject to the registration requirements outlined above.

For situations where non-potable ground water criteria have been used in the site clean-up, Section 28 of the OWRA speaks to the potential for injury to result from consumption of impaired water. Section 103 of the OWRA speaks to the use of a Certificate of Prohibition to be registered on the title of the land.

As described above, the property owner is to register the Certificate of Prohibition on the land title. A clear copy of the Certificate of Prohibition showing the Registry's Office stamp of registration should be provided to the MOEE District Office. Upon receipt of evidence of a stamped Certificate of Prohibition, the MOEE will acknowledge receipt of the second Notice of Clean-up to the property owner.

5.4.2 Withdrawal of Certificate of Prohibition

Subsection 197 (5) (EPA) and subsection 103 (5) (OWRA) also note the Certificate of Withdrawal of Prohibition. If site conditions are further restored such that ground water meets potable criteria, or sub-surface soils meet the Full Depth/Potable (Table A) criteria, a Certificate of Withdrawal of Prohibition (Appendix 4) may then be registered on the land title.

6.0 GUIDANCE ON SENSITIVE SITES

For the purposes of this guideline, sensitive sites are defined as sites that meet any one of the following conditions:

- i) The contaminated site includes or could affect any of the following:
 - a) critical or sensitive habitat for wildlife, migratory species or fisheries
 - b) rare, threatened or endangered species, populations or ecosystems
 - c) lands designated as:
 - I. Environmentally Significant Areas or equivalent in official plans or official plan amendments.
 - II. Ecological Reserves, Areas of Natural and Scientific Interest (ANSI - excluding geological features that are not directly impacted by clean-up) or Provincially Significant Wetlands designated by the Ontario Ministry of Natural Resources (MNR).
- ii) Conditions exist on-site that result in the direct discharge of ground water to surface water in excess of a 10-fold dilution factor utilized in development of generic criteria.
- iii) Inorganic parameters on the site exceed background concentrations (Table F) and soils have a pH (in 0.01 M CaCl₂) of less than 5 or greater than 9 (greater than 11 for sub-surface soils)

For sensitive sites with attribute i), consultation with the local MNR Office, Conservation Authority, or local Municipality should be undertaken to ensure that the generic criteria provide adequate protection. If the consultation indicates that more

protective criteria are needed, background criteria or criteria developed through a SSRA can be undertaken. Table F provides background criteria for certain parameters.

If conditions ii) or iii) apply to the site, clean-up to background levels or a limited SSRA can be undertaken. If condition iii) applies, the local MOEE District Office in consultation with the Standards Development Branch will provide additional guidance as required.

7.0 GUIDANCE ON DEVELOPING OTHER CLEAN-UP CRITERIA

Soil and ground water criteria are provided in this guideline for 117 inorganic and organic parameters. When criteria are not listed for a parameter or parameters identified at a site, the owner/consultant may identify or develop clean-up criteria using the approaches outlined in the subsequent sections. For all scenarios outlined in Section 7, documentation should be submitted to the District Office for review by the Standards Development Branch.

7.1 DEVELOP NEW GENERIC CRITERIA

In situations where generic effects-based criteria are not available in Tables A to D, the property owner may develop site specific or generic criteria. The methodology described in the Canadian Council of Ministers of the Environment (CCME) document entitled A Protocol for the Derivation of Ecological Effects-Based and Human Health-Based Soil Quality Criteria for Contaminated Sites (draft to be finalized) should be utilized whenever possible. MOEE does recognize that for some compounds/elements the protocol may not be suitable, and another effects-based approach may be desirable.

Regardless of the method to be used to develop a new generic criteria, human health, ecological and ground water protection must be fully accounted for, and all references fully documented. Consultation with the MOEE's Standards Development Branch may assist in undertaking this approach.

7.2 CRITERIA FROM ANOTHER JURISDICTION

The use of criteria from other jurisdictions is to be considered only when criteria is not available from Tables A to D.

The proponent will have to provide the criteria rationale to ensure appropriate use of the proposed criteria at the site. The MOEE will review the information and, when appropriate, will provide concurrence for use of the criteria. Proposed criteria must be effects-based and consider human health, ground water use

and ecological receptor concerns as necessary.

7.3 USE OF BACKGROUND CRITERIA

The rural or urban background levels shown in Table F may be used in the following cases.

- (i) when effects-based criteria are not provided in Tables A to D.
- (ii) when the site has been identified as a sensitive site requiring more protective criteria than provided in Tables A to D.
- (iii) at the discretion of the property owner.

Rural background criteria apply only to agricultural land use, and urban background criteria apply to all other land uses. If criteria are not available in Table F, the proponent may develop background criteria.

Background criteria are established as the 98th percentile of the analytical results from a minimum of 30 separate sampling locations from at least 10 different rural or urban parks in Ontario, not impacted by local point sources of pollution. Details on this process are outlined in the MOEE document Ontario Typical Range of Chemical Parameters in Soil, Vegetation, Moss Bags and Snow.

7.4 SITE SPECIFIC RISK ASSESSMENT (SSRA)

Risk assessments are used to estimate the level of risk posed to human health or the environment from the presence of a hazard such as a chemical in soil or ground water. The process involves hazard identification, exposure determination, and the subsequent estimation of a level of risk. This process was outlined in Section 2.1 in the discussion of the development of the guideline criteria.

A site specific risk assessment (SSRA) incorporates site specific data including site conditions and receptor characteristics in estimating whether there is an unacceptable risk to human health and the natural environment from chemicals at a property.

A site-specific risk assessment (SSRA) may be used to:

- (i) assess sensitive sites, and develop more protective clean-up criteria than the generic criteria;

- (ii) develop generic criteria when generic criteria are not provided.
- (iii) develop site specific criteria in lieu of using generic criteria
- (iv) develop risk management\site management plan

The document "Guidance For the Use of Risk Assessments in Site Clean-ups in Ontario" (draft May 1994) has been prepared by MOEE. It provides general guidance on a variety of topics to be considered in the development of a SSRA. Human health, ecological components, and ground water protection should be considered in SSRA.

When undertaking SSRA, literature citations should be documented, and all relevant findings, including, but not restricted to, reference doses, no effect concentrations, lowest effects concentrations, median effective concentrations and lethal effects concentrations should be reported and properly referenced. A report documenting all information relevant to the SSRA criteria development processes must be provided to the MOEE.

When SSRA is used for the purposes outlined above in (i), (ii), (iii) and (iv), the following administrative conditions apply.

1. The SSRA document is to be peer reviewed by a qualified, independent reviewer (no previous involvement with the site), and any outstanding concerns should be resolved prior to submission of documentation to MOEE. The cost of this review will be borne by the proponent.
2. A community-based public consultation program is to be developed and implemented to ensure the public is aware of and, has the opportunity to participate in the SSRA and in the development of the remedial plan.
3. Registration on land title is required to ensure persons acquiring an interest in the property are made aware of a clean-up based on a SSRA. Such a clean-up results in a site that must be managed in a manner that is consistent with the findings of the pathways analysis and the risk management measures and/or controls prescribed in the SSRA.
4. The local municipality (City or other local public authority) must concur with the use of SSRA for the site. Municipal land use controls may be required where risk management\site management includes engineered control measures. This will ensure that site modification does not affect the control measures.

When engineered control measures are proposed, a plan must be developed to address the responsibility for monitoring and maintenance of such control measures, and the responsibility for ensuring corrective action will be taken, if and when it is required. Corrective action may include repair, replacement, or removal of the control measure or of the material posing the adverse effect. This will likely require some form of agreement between the landowner and the municipality, and may be addressed through subdivision agreements, site plan agreements, collateral agreements, or any other appropriate mechanisms.

Specifically, the plan must address or identify, but may not be restricted to, the following:

- the source and nature of the contaminants, their potential impacts and the control measures to be used in eliminating or reducing the impacts to acceptable levels
- the party responsible for monitoring and maintenance of the control measures
- the exact nature of the monitoring and maintenance required, and a schedule for the monitoring and maintenance
- the party to be notified in the event of a need for corrective action, and the part responsible for ensuring appropriate corrective action is undertaken
- the action required should the responsible party be unable to ensure completion of any of the above, and the source and amount of funding available to undertake such actions as required
- the contingency measures included in the design of the control measures
- the administrative controls or agreements required to ensure that the site management controls or measures are not subject to alteration without the prior knowledge and approval of the municipal or local land use authority

8.0 PUBLIC CONSULTATION

MOEE encourages property owners to inform and communicate with the public at each step of the process. Consultation with the immediate neighbours, interested parties, and those who may be affected by the clean-up activities is an essential component of the process. Communication may be established as early as Step 1 (Site Assessment), although Step 2 (Sampling and Analysis) is usually the most common time in the process to begin formal notification and consultation. Consultation should also be

maintained throughout the process. Notification of the interested parties and neighbours should take place a minimum of 30 days prior to implementation of a clean-up plan.

Public consultation should be undertaken when a clean-up is occurring in support of a change of land use for the site in question. It should also be noted that it may be possible to combine these actions with the public consultation requirements under the Planning Act.

The goals of public consultation include the following:

- Providing a forum for public input into the potential sources of contamination on the site (neighbours and employees should be specifically consulted).
- Providing information to the public on the type and extent of contamination on the property and the proposed remediation/clean-up activities to be undertaken.
- Allowing for public input into areas of the clean-up plan that may affect the local residents such as excavation, contaminated soil or ground water processing, truck routes to and from the site, dust, noise, reporting of ambient air quality or treated effluent results.
- Resolving public concerns and maintaining documentation of the consultation program and results.

Public notification may take place by placing advertisements in the public announcement section of local newspapers or community bulletins, or by door to door delivery of flyers or newsletters. Information may also be made available through use of telephone hot lines and/or by placing material in local libraries, community centres or a temporary local office. Summaries of site reports should be made available with complete reports available on request. A public meeting or open house may be considered as another means of information exchange and as a forum for discussion of concerns.

It is not necessary for MOEE staff to be involved in the planning and implementation of the public notification process. The recommendations in this section may be considered minimum recommendations for public notification. When contamination migration results in adverse impacts off-site, or when large, complex clean-ups are being undertaken, additional public input may be warranted.

GLOSSARY

Background - the concentrations of chemicals in soil, water, air or sediment in the local environment which represent ambient conditions in urban or rural settings.

Certificate of Prohibition - A Certificate provided for under Section 197 of the EPA which is registered on land title.

Clean-up - the removal and/or remediation of a chemical substance from the environment to levels specified in this guideline.

Contaminant - as defined in section 1 of the EPA.

Contaminated Soil - for the purpose of this guideline only, contaminated soil refers to soil that exceeds the criteria in tables A to D according to the appropriate land and ground water use categories.

Criteria - numerical limits for concentrations of chemical parameters in soil, sediments, and water to determine the acceptability of a site for specific land uses.

Decommissioning - the moth balling, partial closing, or complete closure of a plant/facility

Director's Order - for the purposes of this guideline, an order issued by an MOEE Director under Section 17 or 18 of the EPA

Full Depth Clean-up - clean-up of all soils to the depth necessary to ensure compliance with criteria in Table A or B

Ground Water - water in the ground which is located in the zone of saturation

Ground Water Use - the use of ground water for domestic or industrial/commercial purposes, and the discharge of ground water to streams or lakes, both to the extent that the ground water on the site has, or is likely to have, an adverse effect on the aquifer being used or on surface water quality.

Non-potable Ground Water Protection - selecting soil or ground water criteria from Table B or D

Phase 1 ESA - a process of gathering and examining documents, maps, and verbal information pertaining to a site, to determine whether a property is or may be contaminated, and to determine the likely nature and location of the contamination. This phase does not normally involve any sampling.

Phase 2 ESA - a process of confirming whether or not

contamination exists and defining the nature and extent of that contamination through surveys, sampling, and analysis.

Potable Ground Water Protection - use of soil and ground water clean-up criteria from Tables A or C

Sensitive Site - a site that may not be protected by using generic criteria due to a sensitive receptor or due to site conditions outside of assumptions used in developing the generic criteria

Soil - loose or unconsolidated material resulting from the breakdown of rock or organic matter by natural physical, chemical, and biological processes and which is capable of supporting plant growth. More than 50% of the material by volume must have a particle size of less than 2 mm.

Stratified Depth Clean-up - a soil clean-up utilizing separate surface and sub-surface criteria from Tables A to D.

Sub-surface Soils - soils greater than 1.5 m from the surface

Surface Soils - soils <=1.5 m from the surface

BIBLIOGRAPHY

Canadian Council of Ministers of the Environment, Sept. 1991; Interim Canadian Environmental Quality Criteria for Contaminated Sites; CCME Subcommittee on Environmental Quality Criteria for Contaminated Sites, CCME EPC-CS34

Canadian Council of Ministers of the Environment, March 1991; National Guidelines for Decommissioning Industrial Sites; CCME Decommissioning Steering Committee, CCME-TS/WM-TRE013E

A Protocol for the Derivation of Ecological Effects-Based and Human Health-Based Soil Quality Criteria for Contaminated Sites - DRAFT 2, July 1993; CCME Subcommittee on Environmental Quality Criteria for Contaminated Sites, The National Contaminated Sites Remediation Program (to be finalized)

Guidelines for the Decommissioning and Clean-up of Sites in Ontario; MOE, Waste Management Branch, Ontario Ministry of the Environment, February 1989;

Guidance on Sampling and Analytical Methods for Site Clean-ups in Ontario; MOEE, Standards Development Branch, Draft - May 1994.

Rationale For the Development and Application of Generic Soil, Ground Water, and Sediment Criteria For Clean-up of Contaminated Sites; MOEE, Standards Development Branch, Draft - May 1994.

Guidance For the Use of Risk Assessments in Site Clean-ups in Ontario; MOEE, Standards Development Branch, Draft - May 1994.

Consulting Engineers of Ontario, April 1993; Generally Accepted Standards For Environmental Investigations

Non-profit Housing Environmental Site Assessment Review Handbook; Ministry of Housing, Housing Policy Branch, November 1993.

CSA Z768, Phase 1 Environmental Site Assessment - Public Review Draft; Canadian Standards Association, Released for review July 1993.

Remediation Technologies For Contaminated Sites - October 1992; MOEE, former Waste Management Branch (now Science and Technology Branch) PIBS 2157.

APPENDIX 1.

RELATED LEGISLATION AND REGULATIONS

APPENDIX 1

ENVIRONMENTAL LEGISLATION

SUMMARY OF MAJOR ONTARIO AND FEDERAL ENVIRONMENTAL ACTS

Ontario Acts

- Conservation Authorities Act (R.S.O. 1990)
 - Consolidated Hearings Act (R.S.O. 1990)
 - Dangerous Goods Transportation Act (R.S.O. 1990)
 - Endangered Species Act (R.S.O. 1990)
 - Environmental Assessment Act (R.S.O. 1990)
 - Environmental Protection Act (R.S.O. 1990)
 - Environmental Protection Statute Law Amendment Act (R.S.O. 1990)
 - Environmental Statute Amendment Act (R.S.O. 1990)
 - Gasoline Handling Act (R.S.O. 1990)
 - Lakes and Rivers Improvement Act (R.S.O. 1990)
 - Municipal Act (R.S.O. 1990)
 - Ontario Waste Management Corporation Act (R.S.O. 1990)
 - Ontario Water Resources Act (R.S.O. 1990)
 - Penalties Adjustment Act (R.S.O. 1990)
 - Pesticides Act (R.S.O. 1990)
 - Planning Act (R.S.O. 1990)
 - Public Utilities Act (R.S.O. 1990)
 - Transboundary Pollution Reciprocal Access Act (R.S.O. 1990)
 - Waste Management Act (R.S.O. 1992)
-

Federal Acts

- Arctic Water Pollution Prevention Act (R.S.C. 1985)
- Atomic Energy Control Act (R.S.C. 1985)
- Canadian Environmental Protection Act (R.S.C. 1985)
- Canada Water Act (R.S.C. 1985)
- Canada Wildlife Act (R.S.C. 1985)
- Fisheries Act (R.S.C. 1985)
- Hazardous Material Information Review Act (R.S.C. 1985)
- International River Improvement Act (R.S.C. 1985)
- Northern Inland Waters Act (R.S.C. 1985)
- Transportation of Dangerous Goods Act (S.C. 1992)

APPENDIX 1. CONT'D

REGULATIONS RELEVANT TO SITE ASSESSMENT AND CLEAN-UP ACTIVITIES

EXAMPLES OF ONTARIO LEGISLATION

A - ENVIRONMENTAL ASSESSMENT ACT (EAA R.S.O. 1990)

REG.334	General Regulations
REG.335	Environmental Assessment Board Rules of Practice

A - ENVIRONMENTAL PROTECTION ACT (EPA R.S.O. 1990)

Part II	General Provisions
Section 1	Definition of Adverse Effect
Section 6	Prohibition of Exceeding Regulatory Limits
Section 7	Control Orders Related to Emissions/Discharges
Section 8	Approvals to Construct, Alter, Extend or Replace
Section 13	Notification of Section 6
Section 14	Prohibition of Discharging a Contaminant Which Causes an Adverse Effect
Section 15	Notification of Section 14
Section 17	Orders to Remediate
Section 18	Study and Reporting of Preventative Measures
Part V	Waste Management
Section 27	Approvals for Waste Management System or Disposal Site
Section 40	Prohibition of Depositing Waste Except at Approved Sites
Section 41	Prohibition on Using Waste Management System Unless Approved
Section 43	Order for the Removal of Waste
Section 46	Prohibition of Using Former Waste Disposal Site
Part X	Spills
Section 92	Notification of Spills
Section 93	Restoration of the Environment
Section 94	Directions by Minister
Section 97	Orders by Minister
Part XI	Control Orders and Stop Orders
Section 124	Control Orders
Section 128	Stop Orders

APPENDIX 1 CONT'D

Part XIV
Section 146
Section 147

Work Done by Ministry
Minister May Cause Things to be Done
Director May Cause Things to be Done

Part XV
Section 156
Section 160
Section 167

Provincial Officers
Inspection by Provincial Officer
Seizure of Files/Samples
Hinder/Obstruct Provincial Officer

Regulations Within EPA:

REG.271	Gasoline Volatility Regulation
REG.336	Air Contaminants from Ferrous Foundries Regulations
REG.337	Ambient Air Quality Criteria Regulations
REG.338	Boilers Regulations
REG.339	Classes of Contaminants - Exemption Regulations
REG.341	Deep Well Disposal Regulations
REG.342	Designation of Waste Regulations
REG.346	General - Air Pollution Regulations
REG.347	General - Waste Management
REG.348	Hauled Liquid Industrial Waste Disposal Sites Regulations
REG.349	Hot Mix Asphalt Facilities Regulation
REG.352	Mobile PCB Destruction Facilities Regulations
REG.356	Ozone Depleting Substances - General Regulations
REG.360	Spills Regulations
REG.362	Waste Management - PCB Regulations

B - ONTARIO WATER RESOURCES ACT (OWRA)

Section 28	Definition of Impaired
Section 29	Supervision of Surface and Ground Waters
Section 30	Prohibition of Discharges of Polluting Material
Section 30(1)	Notification of Discharges
Section 30(2)	Prohibition of Discharges
Section 32	Measures to Alleviate Impairment
Section 33	Protection of Public Water Supplies
Section 34	Permit To Take Water
Section 36	Permit to Construct Well in Designated Area
Section 39	Well Contractor Licence
Section 53	Approvals for Sewage Works
Section 61	Maintenance of Sewage Works
REG.903	Water Well Regulations

APPENDIX 1, CONT'D

C - GASOLINE HANDLING ACT

- | | |
|-----------|--|
| Section 6 | Requirements for aboveground storage tanks |
| Section 7 | Requirements for underground storage tanks |
| Bill 133 | Revision to requirements for underground storage tanks |

D - PESTICIDES ACT

- | | |
|---------|------------------------|
| REG.914 | Pesticides Regulations |
|---------|------------------------|

EXAMPLES OF MUNICIPAL BY-LAWS

A - MODEL SEWER USE BY-LAW

B - NOISE BY-LAW

APPENDIX 2.

GENERIC CLEAN-UP CRITERIA - TABLES A TO F

**Table A: Surface Soil and Groundwater Clean-up Criteria for Three Land Uses
(Agricultural, Residential/Parkland and Industrial/Commercial) in a
Potable Groundwater Situation.**

TABLE A: Surface Soil and Groundwater Clean-up Criteria for Three Land Uses (Agricultural, Residential/Parkland and Industrial/Commercial) in a Potable Groundwater Situation.

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0.				
TABLE A: Chemical Compound	Soil Clean-up Criteria (ug/g)			Groundwater Criteria (ug/L)
	Agricultural Land Use	Residential Parkland Land Use	Industrial Commercial Land Use	All Land Use Categories
ACENAPHTHENE	15	15	15	20
ACENAPHTHYLENE	100	100	130	310
ACETONE	3.5	3.5	3.5	3000
ALDRIN	0.05	0.05	0.05	0.01
ANTHracene	28	28	28	12
ANTIMONY	13	13	40	6
ARSENIC	20	20	20	25
BARIUM	750	750	1500	1000
BENZENE	0.05	0.05	0.05	5
BENZO(a)ANTHRACENE	6.6	6.6	6.6	0.2
BENZO(a)PYRENE	1.2	1.2	1.9	0.01
BENZO(b)FLUORANTHENE	12	12	18	0.2
BENZO(g,h,i)PERYLENE	35	35	35	0.2
BENZO(k)FLUORANTHENE	12	12	18	0.2
BERYLLIUM	2.5	2.5	2.5	4
BIPHENYL, 1,1-	0.89	0.89	0.89	350
BIS(2-CHLOROETHYL)ETHER	0.66	0.66	0.66	4.4
BIS(2-CHLOROISOPROPYL)ETHER	0.66	0.66	0.66	2.2
BIS(2-ETHYLHEXYL)PHTHALATE	100	100	100	6
BORON	1.5*	1.5*	2.0*	5000
BROMODICHLOROMETHANE	0.12	0.12	0.12	5
BROMOFORM	0.11	0.11	0.11	5
BROMOMETHANE	4.5	4.5	4.5	3.7
CADMUM	3	12	12	5
CARBON TETRACHLORIDE	1	1	1	5
CHLORDANE	0.29	0.29	0.29	0.04
CHLOROANILINE, p-	1.3	1.3	1.3	28

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0.

TABLE A: Chemical Compound	Soil Clean-up Criteria (ug/g)			Groundwater Criteria (ug/L)
	Agricultural Land Use	Residential Parkland Land Use	Industrial Commercial Land Use	All Land Use Categories
CHLOROBENZENE	2.4	2.4	2.4	30
CHLOROFORM	0.13	0.13	0.13	5
CHLOROPHENOL, 2-	0.1	0.1	0.1	3.7
CHROMIUM (TOTAL)	750	750	750	50
CHROMIUM (VI)	8	8	8	50
CHRYSENE	6.6	6.6	6.6	0.2
COBALT	40	40	80	100
COPPER	150	225	225	23
CYANIDE	100	100	100	52
DIBENZO(a, h)ANTHRACENE	1.2	1.2	1.9	0.2
DIBROMOCHLOROMETHANE	0.09	0.09	0.09	5
DICHLOROBENZENE, 1,2- (o-DCB)	0.88	0.88	0.88	3
DICHLOROBENZENE, 1,3- (m-DCB)	30	30	30	630
DICHLOROBENZENE, 1,4- (p-DCB)	0.32	0.32	0.32	1
DICHLOROBENZIDINE, 3,3'-	1.3	1.3	1.3	83
DDD	2.2	2.2	3.5	6
DDE	1.6	1.6	2.4	20
DDT	1.6	1.6	2	0.05
DICHLOROETHANE, 1,1-	3	3	3	70
DICHLOROETHANE, 1,2-	0.05	0.05	0.05	5
DICHLOROETHYLENE, 1,1-	0.07	0.07	0.07	0.66
DICHLOROETHYLENE, CIS-1,2-	2.3	2.3	2.3	70
DICHLOROETHYLENE, TRANS-1,2-	4.1	4.1	4.1	100
DICHLOROPHENOL, 2,4-	0.3	0.3	0.3	0.3
DICHLOROPROPANE, 1,2-	0.13	0.13	0.13	5
DICHLOROPROPENE, 1,3-	0.01	0.01	0.01	0.5
DIELDRIN	0.05	0.05	0.05	0.02
DIETHYL PHTHALATE	0.71	0.71	0.71	30
DIMETHYL PHTHALATE	0.66	0.66	0.66	30
DIMETHYLPHENOL, 2,4-	0.2	0.2	0.2	140
DINITROPHENOL, 2,4-	0.2	0.2	0.2	42

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0.

TABLE A:	Soil Clean-up Criteria (ug/g)			Groundwater Criteria (ug/L)
	Agricultural Land Use	Residential Parkland Land Use	Industrial Commercial Land Use	
DINITROTOLUENE, 2,4-	0.66	0.66	0.66	0.5
DIOXIN/FURAN (ng TEQ/g soil)	0.01	1	1	0.000015
ENDOSULFAN	0.18	0.18	0.18	0.35
ENDRIN	0.05	0.05	0.05	0.05
ETHYLBENZENE	0.5	0.5	0.5	2.4
ETHYLENE DIBROMIDE	0.004	0.004	0.004	1
FLUORANTHENE	40	40	40	130
FLUORENE	340	340	340	280
HEPTACHLOR	0.12	0.12	0.15	0.04
HEPTACHLOR EPOXIDE	0.06	0.06	0.09	3
HEXACHLOROBENZENE	0.66	0.66	0.76	0.62
HEXACHLOROBUTADIENE	2.2	2.2	2.2	0.4
HEXACHLOROCYCLOHEXANE, GAMMA	0.41	0.41	0.49	0.8
HEXACHLOROETHANE	6.3	6.3	8.4	2.5
INDENO(1,2,3-cd) PYRENE	12	12	19	0.2
LEAD	60	200	1000	10
MERCURY	10	10	10	0.12
METHOXYCHLOR	4	4	4	0.3
METHYL ETHYL KETONE	0.27	0.27	0.27	350
METHYL ISOBUTYL KETONE	0.48	0.48	0.48	350
METHYL MERCURY	6.8	6.8	10	0.12
METHYL TERT BUTYL ETHER	2.9	2.9	2.9	700
METHYLENE CHLORIDE	1.1	1.1	1.1	50
METHYLNAPHTHALENE, 2-	0.05	0.29	0.29	10
MOLYBDENUM	5	5	40	7300
NAPHTHALENE	4.6	4.6	4.6	21
NICKEL	150	150	150	100
PENTACHLOROPHENOL	5	5	5	30
PETROLEUM HYDROCARBONS(gas/diesel)	100	100	100	1000
PETROLEUM HYDROCARBONS(heavy oils)	100	1000	1000	1000
PHENANTHRENE	40	40	40	63

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0.

TABLE A: Chemical Compound	Soil Clean-up Criteria (ug/g)			Groundwater Criteria (ug/L)
	Agricultural Land Use	Residential Parkland Land Use	Industrial Commercial Land Use	All Land Use Categories
PHENOL	40	40	40	4200
POLYCHLORINATED BIPHENYLS	0.5	5	25	0.2
PYRENE	1.3	3.5	3.5	0.2
SELENIUM	2	2	10	10
SILVER	20	20	40	1.2
STYRENE	1.7	1.7	1.7	100
TETRACHLOROETHANE, 1,1,1,2-	0.39	0.39	0.39	5
TETRACHLOROETHANE, 1,1,2,2-	0.01	0.01	0.01	1
TETRACHLOROETHYLENE	0.45	0.45	0.45	5
THALLIUM	4.1	4.1	32	2
TOLUENE	1	1	1	24
TRICHLOROBENZENE, 1,2,4-	30	30	30	70
TRICHLOROETHANE, 1,1,1-	34	34	34	200
TRICHLOROETHANE, 1,1,2-	0.28	0.28	0.28	5
TRICHLOROETHYLENE	0.39	0.39	0.39	50
TRICHLOROPHENOL, 2,4,5-	3.2	3.2	3.2	200
TRICHLOROPHENOL 2,4,6-	0.66	0.66	0.66	2
VANADIUM	200	200	200	200
VINYL CHLORIDE	0.09	0.09	0.09	0.5
XYLENES	1	1	1	300
ZINC	600	600	600	1100
ELECTRICAL CONDUCTIVITY (mS/cm)	0.70	0.70	1.4	N/A
CHLORIDE	N/V	N/V	N/V	12000
NITROGEN (TOTAL %)	0.5	0.5	0.6	N/V
NITRATE	N/V	N/V	N/V	10000
NITRITE	N/V	N/V	N/V	1000
SODIUM ADSORPTION RATIO (SAR)	5	5	12	N/A
SODIUM	N/V	N/V	N/V	8000

+ Boron Soil Criterion based on Hot Water Extract. N/A = Not applicable. N/V = No Value.

**Table B: Surface Soil and Groundwater Clean-up Criteria for Two Land Uses
(Residential/Parkland and Industrial/Commercial) in a Non-Potable
Groundwater Situation.**

TABLE B: Surface Soil and Groundwater Clean-up Criteria for Two Land Uses (Residential/Parkland and Industrial/Commercial) in a Non-Potable Groundwater Situation.

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0			
TABLE B:	Soil Clean-up Criteria (ug/g)		Groundwater Criteria (ug/L)
Chemical Compound	Residential Parkland Land Use	Industrial Commercial Land Use	Both Land Use Categories
ACENAPHTHENE	1000	1300	1700
ACENAPHTHYLENE	100	840	2000
ACETONE	3.8	3.8	3300
ALDRIN	0.05	0.05	0.2
ANTHRACENE	28	28	12
ANTIMONY	13	40	16000
ARSENIC	20	20	480
BARIUM	750	1500	23000
BENZENE	0.05	0.5	1900
BENZO(a)ANTHRACENE	120	170	5
BENZO(a)PYRENE	1.2	1.9	1.9
BENZO(b)FLUORANTHENE	12	19	7
BENZO(g,h,i)PERYLENE	35	35	0.2
BENZO(k)FLUORANTHENE	12	19	0.4
BERYLLIUM	2.5	2.5	53
BIPHENYL, 1,1-	4.3	4.3	1700
BIS(2-CHLOROETHYL)ETHER	0.66	0.66	110
BIS(2-CHLOROISOPROPYL)ETHER	1.9	2.6	430
BIS(2-ETHYLHEXYL)PHTHALATE	130	330	30
BORON	1.5*	2.0*	50000
BROMODICHLOROMETHANE	14	25	50000
BROMOFORM	19	19	840
BROMOMETHANE	4.5	4.5	3.7
CADMUM	12	12	11
CARBON TETRACHLORIDE	3.3	3.3	17
CHLORDANE	0.29	0.29	0.04
CHLOROANILINE, p-	1.3	1.3	100
CHLOROBENZENE	30	30	500

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0

TABLE B: Chemical Compound	Soil Clean-up Criteria (ug/g)		Groundwater Criteria (ug/L)
	Residential Parkland Land Use	Industrial Commercial Land Use	Both Land Use Categories
CHLOROFORM	11	11	430
CHLOROPHENOL, 2-	10	10	44000
CHROMIUM (TOTAL)	750	750	2000
CHROMIUM (VI)	8	8	110
CHRYSENE	12	19	3
COBALT	40	80	100
COPPER	225	225	23
CYANIDE	100	100	52
DIBENZO(a, h) ANTHRACENE	1.2	1.9	0.25
DIBROMOCHLOROMETHANE	10	18	50000
DICHLOROBENZENE, 1,2- (o-DCB)	30	30	7600
DICHLOROBENZENE, 1,3- (m-DCB)	30	30	7600
DICHLOROBENZENE, 1,4- (p-DCB)	30	30	7600
DICHLOROBENZIDINE, 3,3'-	1.3	1.3	1600
DDD	2.2	3.5	6
DDE	1.6	2.4	20
DDT	1.6	2	0.05
DICHLOROETHANE, 1,1-	100	390	9000
DICHLOROETHANE, 1,2-	0.16	0.16	17
DICHLOROETHYLENE, 1,1-	0.07	0.07	0.66
DICHLOROETHYLENE, CIS-1,2-	2.3	2.3	70
DICHLOROETHYLENE, TRANS-1,2-	4.1	4.1	100
DICHLOROPHENOL, 2,4-	10	10	3700
DICHLOROPROPANE, 1,2-	0.23	0.23	9.3
DICHLOROPROPENE, 1,3-	0.1	0.1	3.8
DIELDRIN	0.05	0.05	0.02
DIETHYL PHTHALATE	0.71	0.71	30
DIMETHYL PHTHALATE	0.66	0.66	30
DIMETHYLPHENOL, 2,4-	13	13	21000
DINITROPHENOL, 2,4-	4.1	4.1	1500
DINITROTOLUENE, 2,4-	1.1	1.8	2300

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0

TABLE B:	Soil Clean-up Criteria (ug/g)		Groundwater Criteria (ug/L)
	Residential Parkland Land Use	Industrial Commercial Land Use	
Chemical Compound			Both Land Use Categories
DIOXIN/FURAN (ng TEQ/g soil)	1	1	0.000015
ENDOSULFAN	0.29	0.29	0.56
ENDRIN	0.05	0.05	0.05
ETHYLBENZENE	0.5	5	28000
ETHYLENE DIBROMIDE	0.01	0.02	3.3
FLUORANTHENE	40	40	130
FLUORENE	350	350	290
HEPTACHLOR	0.12	0.15	0.04
HEPTACHLOR EPOXIDE	0.06	0.09	6.0
HEXAChLOROBENZENE	0.66	0.76	0.62
HEXAChLOROBUTADIENE	4.3	4.3	0.87
HEXAChLOROCYCLOHEXANE, GAMMA	0.41	0.49	0.8
HEXAChLOROETHANE	6.3	13	12
INDENO(1,2,3-cd)PYRENE	12	19	0.27
LEAD	200	1000	32
MERCURY	10	10	0.12
METHOXYCHLOR	4	4	0.3
METHYL ETHYL KETONE	38	38	50000
METHYL ISOBUTYL KETONE	68	68	50000
METHYL MERCURY	6.8	10	0.12
METHYL TERT BUTYL ETHER	100	210	50000
METHYLENE CHLORIDE	120	200	50000
METHYLNAPHTHALENE, 2-	30	30	13000
MOLYBDENUM	5	40	7300
NAPHTHALENE	40	40	5900
NICKEL	150	150	1600
PENTACHLOROPHENOL	5	5	130
PETROLEUM HYDROCARBONS(gas/diesel)	100	1000	50000
PETROLEUM HYDROCARBONS(heavy oils)	1000	5000	50000
PHENANTHRENE	40	40	63
PHENOL	40	40	26000

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 9.0

TABLE B: Chemical Compound	Soil Clean-up Criteria (ug/g)		Groundwater Criteria (ug/L)
	Residential Parkland Land Use	Industrial Commercial Land Use	Both Land Use Categories
POLYCHLORINATED BIPHENYLS	5	25	0.2
PYRENE	3.5	3.5	0.2
SELENIUM	2	10	50
SILVER	20	40	1.2
STYRENE	16	16	940
TETRACHLOROETHANE, 1,1,1,2-	0.46	0.46	6
TETRACHLOROETHANE, 1,1,2,2-	0.22	0.22	22
TETRACHLOROETHYLENE	0.45	0.45	5
THALLIUM	4.1	32	400
TOLUENE	1	10	5900
TRICHLOROBENZENE, 1,2,4-	30	30	500
TRICHLOROETHANE, 1,1,1-	34	34	200
TRICHLOROETHANE, 1,1,2-	2.3	3.1	16000
TRICHLOROETHYLENE	0.39	0.39	50
TRICHLOROPHENOL, 2,4,5-	10	10	630
TRICHLOROPHENOL 2,4,6-	10	10	9700
VANADIUM	200	200	200
VINYL CHLORIDE	0.09	0.09	0.5
XYLEMES	1	5	5600
ZINC	600	600	1100
ELECTRICAL CONDUCTIVITY (mS/cm)	0.70	1.4	N/A
CHLORIDE	N/V	N/V	12000
NITROGEN (TOTAL %)	0.5	0.6	N/V
NITRATE	N/V	N/V	N/V
NITRITE	N/V	N/V	2000
SODIUM ADSORPTION RATIO (SAR)	5	12	N/A
SODIUM	N/V	N/V	8000

+ Boron Soil Criterion based on Hot Water Extract. N/A = Not applicable. N/V = No Value.

**Table C: Sub-Surface Soil Clean-up Criteria for Two Land Uses
(Residential/Parkland and Industrial/Commercial) in a Potable Groundwater
Situation.**

TABLE C: Sub-Surface Soil Clean-up Criteria for Two Land Uses
 (Residential/Parkland and Industrial/Commercial) in a
 Potable Groundwater Situation.

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0		
TABLE C:	Soil Clean-up Criteria (ug/g)	
Chemical Compound	Residential Parkland Land Use	Industrial Commercial Land Use
ACENAPHTHENE	15*	15*
ACENAPHTHYLENE	130	130*
ACETONE	3.5*	3.5*
ALDRIN	0.05*	0.08
ANTHRACENE	28*	28*
ANTIMONY	44	44
ARSENIC	40	N/V
BARIUM	1500	N/V
BENZENE	0.05*	0.05*
BENZO (a) ANTHRACENE	6.6*	6.6*
BENZO (a) PYRENE	1.2*	7.2
BENZO (b) FLUORANTHENE	18	18*
BENZO (g, h, i) PERYLENE	35*	35*
BENZO (k) FLUORANTHENE	18	18*
BERYLLIUM	2.5*	3.1
BIPHENYL, 1,1-	0.89*	0.89*
BIS(2-CHLOROETHYL) ETHER	0.66*	0.66*
BIS(2-CHLOROISOPROPYL) ETHER	0.66*	0.66*
BIS(2-ETHYLHEXYL) PHTHALATE	100*	100*
BORON	2.0*	N/V
BROMODICHLOROMETHANE	0.12*	0.12*
BROMOFORM	0.11*	0.11*
BROMOMETHANE	4.5*	4.5*
CADMIUM	83	83
CARBON TETRACHLORIDE	1*	1*
CHLORDANE	0.29*	0.29*
CHLOROANILINE, p-	1.3*	1.3*
CHLOROBENZENE	2.4*	2.4*
CHLOROFORM	0.13*	0.13*

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE C: Chemical Compound	Soil Clean-up Criteria (ug/g)	
	Residential Parkland Land Use	Industrial Commercial Land Use
CHLOROPHENOL, 2-	0.1*	0.1*
CHROMIUM (TOTAL)	2500	5000
CHROMIUM (VI)	600	1100
CHRYSENE	6.6*	6.6*
COBALT	80	N/V
COPPER	225*	N/V
CYANIDE	100*	390
DIBENZO(a,h)ANTHRACENE	1.9	7.2
DIBROMOCHLOROMETHANE	0.09*	0.09*
DICHLOROBENZENE, 1,2- (o-DCB)	0.88*	0.88*
DICHLOROBENZENE, 1,3- (m-DCB)	190	190
DICHLOROBENZENE, 1,4- (p-DCB)	0.32*	0.32*
DICHLOROBENZIDINE, 3,3'-	1.3*	2.6
DDD	3.5	13
DDE	2.4	8.9
DDT	2	2*
DICHLOROETHANE, 1,1-	3*	3*
DICHLOROETHANE, 1,2-	0.05*	0.05*
DICHLOROETHYLENE, 1,1-	0.07*	0.07*
DICHLOROETHYLENE, CIS-1,2-	2.3*	2.3*
DICHLOROETHYLENE, TRANS-1,2-	4.1*	4.1*
DICHLOROPHENOL, 2,4-	0.3*	0.3*
DICHLOROPROPANE, 1,2-	0.13*	0.13*
DICHLOROPROPENE, 1,3-	0.01*	0.01*
DIELDRIN	0.05*	0.05*
DIETHYL PHTHALATE	0.71*	0.71*
DIMETHYL PHTHALATE	0.66*	0.66*
DIMETHYLPHENOL, 2,4-	0.2*	0.2*
DINITROPHENOL, 2,4--	0.2*	0.2*
DINITROTOLUENE, 2,4-	0.66*	0.66*
DICXIN/FURAN (ng TEQ/g soil)	1*	N/V
ENDOSULFAN	0.18*	0.18*

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE C:	Soil Clean-up Criteria (ug/g)	
Chemical Compound	Residential Parkland Land Use	Industrial Commercial Land Use
ENDRIN	0.05*	0.05*
ETHYLBENZENE	0.5*	0.5*
ETHYLENE DIBROMIDE	0.004*	0.004*
FLUORANTHENE	840	840
FLUORENE	340*	340*
HEPTACHLOR	0.15	0.15*
HEPTACHLOR EPOXIDE	0.09	0.33
HEXACHLOROBENZENE	0.76	2.8
HEXACHLOROBUTADIENE	2.2*	2.2*
HEXACHLOROCYCLOHEXANE, GAMMA	0.49	0.49*
HEXACHLOROETHANE	8.5	8.5
INDENO(1, 2, 3-cd) PYRENE	19	53
LEAD	1000	N/V
MERCURY	57	57
METHOXYCHLOR	4*	4*
METHYL ETHYL KETONE	0.27*	0.27*
METHYL ISOBUTYL KETONE	0.48*	0.48*
METHYL MERCURY	18	18
METHYL TERT BUTYL ETHER	2.9*	2.9*
METHYLENE CHLORIDE	1.1*	1.1*
METHYLNAPHTHALENE, 2-	0.29*	0.29*
MOLYBDENUM	40	N/V
NAPHTHALENE	4.6*	4.6*
NICKEL	710	710
PENTACHLOROPHENOL	12	43
PETROLEUM HYDROCARBONS (gas/diesel)	100*	100*
PETROLEUM HYDROCARBONS (heavy oils)	1000*	1000*
PHENANTHRENE	150	150
PHENOL	64	64
POLYCHLORINATED BIPHENYLS	25	N/V
PYRENE	3.5*	3.5*
SELENIUM	2500	2500

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE C: Chemical Compound	Soil Clean-up Criteria (ug/g)	
	Residential Parkland Land Use	Industrial Commercial Land Use
SILVER	240	240
STYRENE	1.7*	1.7*
TETRACHLOROETHANE, 1,1,1,2-	0.39*	0.39*
TETRACHLOROETHANE, 1,1,2,2-	0.01*	0.01*
TETRACHLOROETHYLENE	0.45*	0.45*
THALLIUM	32	150
TOLUENE	1*	1*
TRICHLOROBENZENE, 1,2,4-	110	110
TRICHLOROETHANE, 1,1,1-	34*	34*
TRICHLOROETHANE, 1,1,2-	0.28*	0.28*
TRICHLOROETHYLENE	0.39*	0.39*
TRICHLOROPHENOL, 2,4,5-	3.2*	3.2*
TRICHLOROPHENOL 2,4,6-	0.66*	0.66*
VANADIUM	200*	N/V
VINYL CHLORIDE	0.09*	0.09*
XYLENES	1*	1*
ZINC	2500	5000
ELECTRICAL CONDUCTIVITY (mS/cm)	N/A	N/A
CHLORIDE	N/V	N/V
NITROGEN (TOTAL %)	0.6	N/V
NITRATE	N/V	N/V
NITRITE	N/V	N/V
SODIUM ADSORPTION RATIO (SAR)	N/A	N/A
SODIUM	N/V	N/V

* Criterion value is the same as the corresponding criterion in Table A.

+ Boron Soil Criterion base on Hot Water Extract.

N/A = Not applicable. N/V = No Value.

**Table D: Sub-Surface Soil Clean-up Criteria for Two Land Uses
(Residential/Parkland and Industrial/Commercial) in a Non-Potable Groundwater
Situation.**

TABLE D: Sub-Surface Soil Clean-up Criteria for Two Land Uses
(Residential/Parkland and Industrial/Commercial) in a
Non-Potable Groundwater Situation.

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0		
TABLE D:	Soil Clean-up Criteria (ug/g)	
Chemical Compound	Residential Parkland Land Use	Industrial Commercial Land Use
ACENAPHTHENE	1300	1300*
ACENAPHTHYLENE	840	840*
ACETONE	3.8*	3.8*
ALDRIN	0.05*	0.15
ANTHRACENE	28*	28*
ANTIMONY	44	44
ARSENIC	40	N/V
BARIUM	1500	N/V
BENZENE	0.5	2
BENZO (a) ANTHRACENE	170	170*
BENZO (a) PYRENE	1.9	7.2
BENZO (b) FLUORANTHENE	19	72
BENZO (g, h, i) PERYLENE	35*	35*
BENZO (k) FLUORANTHENE	19	37
BERYLLIUM	2.5*	3.1
BIPHENYL, 1,1-	4.3*	4.3*
BIS(2-CHLOROETHYL) ETHER	0.66*	0.66*
BIS(2-CHLOROISOPROPYL) ETHER	2.6	4.7
BIS(2-ETHYLHEXYL) PHTHALATE	330	500
BORON	2.0*	N/V
BROMODICHLOROMETHANE	25	90
BROMOFORM	19*	19*
BROMOMETHANE	4.5*	4.5*
CADMIUM	83	83
CARBON TETRACHLORIDE	3.3*	3.3*
CHLORDANE	0.29*	0.29*
CHLOROANILINE, p-	1.3*	1.3*
CHLOROBENZENE	40	40
CHLOROFORM	11*	11*

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE D:	Soil Clean-up Criteria (ug/g)	
Chemical Compound	Residential Parkland Land Use	Industrial Commercial Land Use
CHLOROPHENOL, 2-	25	25
CHROMIUM (TOTAL))	2500	5000
CHROMIUM (VI)	600	1100
CHRYSENE	19	72
COBALT	80	N/V
COPPER	225*	N/V
CYANIDE	100*	390
DIBENZO(a,h)ANTHRACENE	1.9	7.2
DIBROMOCHLOROMETHANE	18	67
DICHLOROBENZENE, 1,2- (o-DCB)	500	500
DICHLOROBENZENE, 1,3- (m-DCB)	500	500
DICHLOROBENZENE, 1,4- (p-DCB)	66	230
DICHLOROBENZIDINE, 3,3'-	1.3*	2.7
DDD	3.5	13
DDE	2.4	8.9
DDT	2	2*
DICHLOROETHANE, 1,1-	390	390*
DICHLOROETHANE, 1,2-	0.16*	0.16*
DICHLOROETHYLENE, 1,1-	0.07*	0.07*
DICHLOROETHYLENE, CIS-1,2-	2.3*	2.3*
DICHLOROETHYLENE, TRANS-1,2-	4.1*	4.1*
DICHLOROPHENOL, 2,4-	94	94
DICHLOROPROPANE, 1,2-	0.23*	0.23*
DICHLOROPROPENE, 1,3-	0.1*	0.1*
DIELDRIN	0.05*	0.05*
DIETHYL PHTHALATE	0.71*	0.71*
DIMETHYL PHTHALATE	0.66*	0.66*
DIMETHYLPHENOL, 2,4-	13*	13*
DINITROPHENOL, 2,4-	4.1*	4.1*
DINITROTOLUENE, 2,4-	1.8	6.6
DIOXIN/FURAN (ng TEQ/g soil)	1*	N/V
ENDOSULFAN	0.29*	0.29*

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE D: Chemical Compound	Soil Clean-up Criteria (ug/g)	
	Residential Parkland Land Use	Industrial Commercial Land Use
ENDRIN	0.05*	0.05*
ETHYLBENZENE	5	100
ETHYLENE DIBROMIDE	0.02	0.02*
FLUORANTHENE	840	840
FLUORENE	350*	350*
HEPTACHLOR	0.15	0.15*
HEPTACHLOR EPOXIDE	0.09	0.33
HEXACHLOROBENZENE	0.76	2.8
HEXACHLOROBUTADIENE	4.3*	4.3*
HEXACHLOROCYCLOHEXANE, GAMMA	0.49	0.49*
HEXACHLOROETHANE	13	42
INDENO(1,2,3-cd) PYRENE	19	70
LEAD	1000	N/V
MERCURY	57	57
METHOXYCHLOR	4*	4*
METHYL ETHYL KETONE	38*	38*
METHYL ISOBUTYL KETONE	68*	68*
METHYL MERCURY	18	18
METHYL TERT BUTYL ETHER	210	210*
METHYLENE CHLORIDE	200	740
METHYLNAPHTHALENE, 2-	30*	30*
MOLYBDENUM	40	N/V
NAPHTHALENE	1300	1300
NICKEL	710	710
PENTACHLOROPHENOL	12	43
PETROLEUM HYDROCARBONS(gas/diesel)	1000	5000
PETROLEUM HYDROCARBONS(heavy oils)	5000	5000*
PHENANTHRENE	150	150
PHENOL	390	390
POLYCHLORINATED BIPHENYLS	25	N/V
PYRENE	3.5*	3.5*
SELENIUM	2500	2500

SOIL CRITERIA FOR INORGANICS IN THIS TABLE APPLY ONLY WHERE SOIL pH IS 5.0 TO 11.0

TABLE D: Chemical Compound	Soil Clean-up Criteria (ug/g)	
	Residential Parkland Land Use	Industrial Commercial Land Use
SILVER	240	240
STYRENE	16*	16*
TETRACHLOROETHANE, 1,1,1,2-	0.46*	0.46*
TETRACHLOROETHANE, 1,1,2,2-	0.22*	0.22*
TETRACHLOROETHYLENE	0.45*	0.45*
THALLIUM	32	150
TOLUENE	10	100
TRICHLOROBENZENE, 1,2,4-	770	770
TRICHLOROETHANE, 1,1,1-	34*	34*
TRICHLOROETHANE, 1,1,2-	3.1	12
TRICHLOROETHYLENE	0.39*	0.39*
TRICHLOROPHENOL, 2,4,5-	10*	10*
TRICHLOROPHENOL 2,4,6-	59	220
VANADIUM	200*	N/V
VINYL CHLORIDE	0.09*	0.09*
XYLENES	5	50
ZINC	2500	5000
ELECTRICAL CONDUCTIVITY (mS/cm)	N/A	N/A
CHLORIDE	N/V	N/V
NITROGEN (TOTAL %)	N/V	N/V
NITRATE	N/V	N/V
NITRITE	N/V	N/V
SODIUM ADSORPTION RATIO (SAR)	N/A	N/A
SODIUM	N/V	N/V

* Criterion value is the same as the corresponding criterion in Table B.

* Boron soil criterion based on Hot Water Extract.

N/A = Not applicable. N/V = No value.

Table E: Sediment Quality Criteria

TABLE E: Sediment Quality Criteria

TABLE E: Chemical Compound	Lowest Effect Level (ug/g)
	All Land Use Categories
ACENAPHTHENE	0.220
ACENAPHTHYLENE	*
ACETONE	*
ALDRIN	0.002
ANTHRACENE	*
ANTIMONY	*
ARSENIC	6
BARIUM	*
BENZENE	*
BENZO(a) ANTHRACENE	0.320
BENZO(a) PYRENE	0.370
BENZO(b) FLUORANTHENE	*
BENZO(g, h, i) PERYLENE	0.170
BENZO(k) FLUORANTHENE	0.240
BERYLLIUM	*
BIPHENYL, 1,1-	*
BIS(2-CHLOROETHYL) ETHER	*
BIS(2-CHLOROISOPROPYL) ETHER	*
BIS(2-ETHYLHEXYL) PHTHALATE	*
BORON	*
BROMODICHLOROMETHANE	*
BROMOFORM	*
BROMOMETHANE	*
CADMUM	0.6
CARBON TETRACHLORIDE	*
CHLORDANE	0.007
CHLOROANILINE, p-	*
CHLOROBENZENE	*
CHLOROFORM	*
CHLOROPHENOL, 2-	*
CHROMIUM (TOTAL)	26
CHROMIUM (VI)	*
CHRYSENE	0.340

TABLE E:	Lowest Effect Level (ug/g)
Chemical Compound	All Land Use Categories
COBALT	*
COPPER	16
CYANIDE	*
DIBENZO(a,h) ANTHRACENE	0.060
DIBROMOCHLOROMETHANE	*
DICHLOROBENZENE, 1,2- (o-DCB)	*
DICHLOROBENZENE, 1,3- (m-DCB)	*
DICHLOROBENZENE, 1,4- (p-DCB)	*
DICHLOROBENZIDINE, 3,3'-	*
DDD	0.008
DDE	0.005
DDT	0.007
DICHLOROETHANE, 1,1-	*
DICHLOROETHANE, 1,2-	*
DICHLOROETHYLENE, 1,1-	*
DICHLOROETHYLENE, CIS-1,2-	*
DICHLOROETHYLENE, TRANS-1,2-	*
DICHLOROPHENOL, 2,4-	*
DICHLOROPROPANE, 1,2-	*
DICHLOROPROPENE, 1,3-	*
DIEDDRIN	0.002
DIETHYL PHTHALATE	*
DIMETHYL PHTHALATE	*
DIMETHYLPHENOL, 2,4-	*
DINITROPHENOL, 2,4-	*
DINITROTOLUENE, 2,4-	*
DIOXIN/FURAN (ng TEQ/g sediment)	*
ENDOSULFAN	*
ENDRIN	0.003
ETHYLBENZENE	*
ETHYLENE DIBROMIDE	*
FLUORANTHENE	0.750
FLUORENE	0.190
HEPTACHLOR	*

TABLE E:	Lowest Effect Level (ug/g)
Chemical Compound	All Land Use Categories
HEPTACHLOR EPOXIDE	0.005
HEXACHLOROBENZENE	*
HEXACHLOROBUTADIENE	*
HEXACHLOROCYCLOHEXANE, GAMMA	*
HEXACHLOROETHANE	*
INDENO(1, 2, 3-cd) PYRENE	0.200
LEAD	31
MERCURY	0.2
METHOXYPHOR	*
METHYL ETHYL KETONE	*
METHYL ISOBUTYL KETONE	*
METHYL MERCURY	*
METHYL TERT BUTYL ETHER	*
METHYLENE CHLORIDE	*
METHYLNAPHTHALENE, 2-	*
MOLYBDENUM	*
NAPHTHALENE	*
NICKEL	16
PENTACHLOROPHENOL	*
PHENANTHRENE	0.560
PHENOL	*
POLYCHLORINATED BIPHENYLS	0.07
PYRENE	0.490
SELENIUM	*
SILVER	*
STYRENE	*
TETRACHLOROETHANE, 1, 1, 1, 2-	*
TETRACHLOROETHANE, 1, 1, 2, 2-	*
TETRACHLOROETHYLENE	*
THALLIUM	*
TOLUENE	*
TOTAL PETROLEUM HYDROCARBONS (gas/diesel)	*
TOTAL PETROLEUM HYDROCARBONS (heavy oils)	*
TRICHLOROBENZENE, 1, 2, 4-	*

TABLE E:	Lowest Effect Level (ug/g)
Chemical Compound	All Land Use Categories
TRICHLOROETHANE, 1,1,1-	*
TRICHLOROETHANE, 1,1,2-	*
TRICHLOROETHYLENE	*
TRICHLOROPHENOL, 2,4,5-	*
TRICHLOROPHENOL 2,4,6-	*
VANADIUM	*
VINYL CHLORIDE	*
XYLENES	*
ZINC	120
ELECTRICAL CONDUCTIVITY (mS/cm)	N/A
CHLORIDE	*
NITROGEN (TOTAL %)	550
NITRITE/NITRATE	*
SODIUM ADSORPTION RATIO (SAR)	N/A
SODIUM	*

Note: * No value derived.
N/A = Not Applicable

Table F: Ontario Background Soil Concentrations

TABLE F: Ontario Background Soil Concentrations

TABLE F:	Soil Background Concentration (ug/g)	
Chemical Compound	Values Acceptable for Application to Agricultural Land Use	Values Acceptable for Application to Residential and Parkland Land Use
ACENAPHTHENE	0.05	0.54
ACENAPHTHYLENE	0.23	0.26
ACETONE	*	*
ALDRIN	0.05	0.05
ANTHRACENE	0.05	0.69
ANTIMONY	1.0	1.0
ARSENIC	14	28
BARIUM	190	210
BENZENE	0.002	0.002
BENZO(a) ANTHRACENE	0.07	0.69
BENZO(a) PYRENE	0.07	0.81
BENZO(b) FLUORANTHENE	0.15	1.6
BENZO(g, h, i) PERYLENE	0.10	0.60
BENZO(k) FLUORANTHENE	0.05	0.05
BERYLLIUM	2.5	2.5
BIPHENYL, 1,1-	*	*
BIS(2-CHLOROETHYL) ETHER	*	*
BIS(2-CHLOROISOPROPYL) ETHER	*	*
BIS(2-ETHYLHEXYL) PHTHALATE	*	*
BORON	37	37
BROMODICHLOROMETHANE	*	*
BROMOFORM	0.002	0.002
BROMOMETHANE	0.003	0.003
CADMIUM	1.0	1.0
CARBON TETRACHLORIDE	0.002	0.002
CHLORDANE	0.05	0.05
CHLOROANILINE, p-	*	*
CHLOROBENZENE	0.002	0.002
CHLOROFORM	0.006	0.006
CHLOROPHENOL, 2-	0.1	0.1
CHROMIUM (TOTAL)	67	71
CHROMIUM (VI)	2.5	2.5

TABLE F:	Soil Background Concentration (ug/g)	
Chemical Compound	Values Acceptable for Application to Agricultural Land Use	Values Acceptable for Application to Residential and Parkland Land Use
CHRYSENE	0.18	0.94
COBALT	19	21
COPPER	56	85
CYANIDE	0.12	0.12
DIBENZO(a, h) ANTHRACENE	0.10	0.36
DIBROMOCHLOROMETHANE	0.003	0.003
DICHLOROBENZENE, 1,2- (o-DCB)	0.002	0.002
DICHLOROBENZENE, 1,3- (m-DCB)	0.002	0.002
DICHLOROBENZENE, 1,4- (p-DCB)	0.002	0.002
DICHLOROBENZIDINE, 3,3'-	*	*
DDD	*	*
DDE	*	*
DDT	0.10	1.4
DICHLOROETHANE, 1,1-	0.002	0.002
DICHLOROETHANE, 1,2-	0.002	0.002
DICHLOROETHYLENE, 1,1-	0.002	0.002
DICHLOROETHYLENE, CIS-1,2-	*	*
DICHLOROETHYLENE, TRANS-1,2-	*	*
DICHLOROPHENOL, 2,4-	0.1	0.1
DICHLOROPROPANE, 1,2-	0.002	0.002
DICHLOROPROPENE, 1,3-	0.002	0.002
DIEDRIN	0.05	0.05
DIETHYL PHTHALATE	*	*
DIMETHYL PHTHALATE	*	*
DIMETHYLPHENOL, 2,4-	0.2	0.2
DINITROPHENOL, 2,4-	0.2	0.2
DINITROTOLUENE, 2,4-	*	*
DIÖXIN/FURAN (ng TEQ/g soil)	0.007	0.007
ENDOSULFAN	*	*
ENDRIN	0.05	0.05
ETHYLBENZENE	0.002	0.002
ETHYLENE DIBROMIDE	0.004	0.004
FLUORANTHENE	0.24	4.6

TABLE F:	Soil Background Concentration (ug/g)	
	Chemical Compound	Values Acceptable for Application to Agricultural Land Use
FLUORENE	0.05	0.46
HEPTACHLOR	0.05	0.05
HEPTACHLOR EPOXIDE	0.05	0.05
HEXACHLOROBENZENE	*	*
HEXACHLOROBUTADIENE	*	*
HEXACHLOROCYCLOHEXANE, GAMMA	*	*
HEXACHLOROETHANE	*	*
INDENO(1,2,3-cd)PYRENE	0.10	0.46
LEAD	55	120
MERCURY	0.16	0.23
METHOXYCHLOR	0.05	0.05
METHYL ETHYL KETONE	*	*
METHYL ISOBUTYL KETONE	*	*
METHYL MERCURY	*	*
METHYL TERT BUTYL ETHER	"	*
METHYLENE CHLORIDE	0.003	0.003
METHYLNAPHTHALENE, 2-	0.05	0.29
MOLYBDENUM	2.5	2.5
NAPHTHALENE	0.05	0.20
NICKEL	43	43
PENTACHLOROPHENOL	0.1	0.1
PETROLEUM HYDROCARBONS (gas/diesel)	*	*
PETROLEUM HYDROCARBONS (heavy oils)	*	*
PHENANTHRENE	0.19	3.4
PHENOL	0.1	0.1
POLYCHLORINATED BIPHENYLS	0.3	0.3
PYRENE	0.19	3.5
SELENIUM	1.4	1.9
SILVER	0.35	0.42
STYRENE	0.002	0.002
TETRACHLOROETHANE, 1,1,1,2-	*	*
TETRACHLOROETHANE, 1,1,2,2-	0.004	0.004
TETRACHLOROETHYLENE	0.002	0.002

TABLE F:	Soil Background Concentration (ug/g)	
Chemical Compound	Values Acceptable for Application to Agricultural Land Use	Values Acceptable for Application to Residential and Parkland Land Use
THALLIUM	2.5	2.5
TOLUENE	0.002	0.002
TRICHLOROBENZENE, 1,2,4-	*	*
TRICHLOROETHANE, 1,1,1-	0.008	0.009
TRICHLOROETHANE, 1,1,2-	0.002	0.002
TRICHLOROETHYLENE	0.004	0.004
TRICHLOROPHENOL, 2,4,5-	0.1	0.1
TRICHLOROPHENOL 2,4,6-	0.1	0.1
VANADIUM	91	91
VINYL CHLORIDE	0.003	0.003
XYLENES	0.002	0.002
ZINC	150	160
ELECTRICAL CONDUCTIVITY (mS/cm)	0.47	0.57
CHLORIDE	58	330
NITROGEN (TOTAL %)	0.007	0.007
NITRITE/NITRATE	40	61
SODIUM ADSORPTION RATIO (SAR)	1.0	2.4
SODIUM	*	*

Note: * No value derived.

APPENDIX 3.

GUIDANCE ON CRITERIA EXCEEDANCES

APPENDIX 3. GUIDANCE ON DEALING WITH SOIL, SEDIMENT, GROUND WATER, SURFACE WATER, AND AIR DATA

Guidance is provided below for dealing with analytical exceedances of soil, sediment, and ground water clean-up criteria. Guidance on surface water and air quality impacts are also provided.

Soils

If a single sample result or the mean of replicate samples exceeds a guideline value, that sample is deemed to have failed the guideline, and soil up to the next sample site that passes the guideline is also deemed to be in exceedence of the criteria. This approach allows the property owner to choose between additional sampling to better define contaminated areas or remediate all potentially contaminated soils.

Ground Water

Any sample result exceeding an effects based criteria is deemed to be an exceedence of the criteria that should trigger a remediation plan, provided that ground water quality for that parameter is poorer on site or immediately down gradient from the site than it is immediately up gradient from the site.

Sediments

Where sediment quality criteria are provided, any exceedence of the Lowest Effect Level should trigger an examination of the source of the contaminated sediments and, if the source is on-site, a remediation plan should be developed. Where sediment criteria are not provided, and if a comparison of upstream and downstream sediment quality shows a degradation of sediment quality, not accounted for by the cumulative effects of sampling and analytical variation, then a cause or source should be identified, and a remediation plan developed.

Surface Waters and Air

If surface waters are impacted, i.e., a comparison of upstream/downstream water quality shows degradation in water quality (not accounted for by the cumulative effects of sampling and analytical variation), the sources of the contamination should be identified and remediated. Similarly, if ambient air is found to be of concern before, during, or after clean-up activities (in accordance with ambient air standards and guidelines - Regulation 346 or other provisions under the EPA), the sources of the contamination should be identified and remediated.

APPENDIX 4.

COMPLETION OF CLEAN-UP DOCUMENTATION

**NOTICE OF CLEAN-UP
DIRECTOR'S ORDER
CERTIFICATE OF PROHIBITION
WITHDRAWAL OF CERTIFICATE OF PROHIBITION**

SCHEDULE 1 - NOTICE OF CLEAN-UP

under the "Guideline for the Clean-Up of Contaminated Sites in Ontario, dated _____, 1994"

Under Section 167 of the Environmental Protection Act, "No person shall hinder or obstruct a provincial officer in the lawful performance of his or her duties or furnish a provincial officer with false information or refuse to furnish the provincial officer with information required for the purposes of this Act and the regulations."

To: Ministry of Environment and Energy (MOEE)
(Insert Name of Provincial Officer for the area)
(Insert Name) District Office
(Insert Address of MOEE District Office)

From: Property Owner*
(Insert Municipal Address)
(Legal Description of Property
i.e. plot plan, number etc.)

* (Certificate of Status and Confirmation of Ownership must be provided.)

1. This is to certify that information pertaining to the above property contained in the following reports have been assessed by a Professional Engineer/consultant retained by the owner:

	Title	Author	Date
1.			
2.			

This is to confirm that the Professional Engineer (P. Eng.) retained by the owner has certified that clean-up has been completed in accordance with relevant legislation, regulations and MOEE guidelines.

2. TYPE OF CLEAN-UP (please check accordingly)

Background Levels Full Depth Stratified Site Specific Risk Assessment

This site has been cleaned up to meet the following land use:

Agricultural Residential/Parkland Industrial/Commercial

Sensitive Site: No Yes - if yes indicate who was consulted:

Groundwater: Potable Non-Potable (attach rationale for use)

3. SITE PROFILE AFTER CLEAN-UP (attach additional page if needed).

Chemical Name	Guideline Limit	Maximum Concentration (anywhere on site)
Surface		
Soil	_____ (µg/g)	_____ (µg/g)
	_____ (µg/g)	_____ (µg/g)
Sub-surface		
Soil	_____ (µg/g)	_____ (µg/g)
	_____ (µg/g)	_____ (µg/g)
Groundwater		
	_____ (µg/L)	_____ (µg/L)
	_____ (µg/L)	_____ (µg/L)

SCHEDULE 1 - NOTICE OF CLEAN-UP

under the "Guideline for the Clean-Up of Contaminated Sites in Ontario, dated _____, 1994"

4. Summary of Risk Management Measures if Site Specific Risk Assessment conducted:

5. Signature of Property Owner

This is to certify personally (and on behalf of the owner if different) that as the owner of the property, I have (or the owner has) employed/hired _____, a Professional Engineer within the meaning of the Ontario Professional Engineers Act, as the principal consultant ("Principal Consultant") to undertake and complete a clean-up of the Property as set out in Box 2 above in accordance with relevant legislation, regulations and MOEE guidelines. I (*or the owner*) agree to disclose this information and any reports prepared by or for the Principal Consultant and its subcontractors to all parties acquiring or intending to acquire an interest in this property. I am not aware of any environmental conditions affecting the property which would interfere with its safe use for the land use category set out in Box 2 above. I acknowledge that public authorities and future owners, occupants, and others may rely on this Notice.

Name (please print)	Signature	Date
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6. Certification by the Consultant

I certify that I am a Professional Engineer(**) within the meaning of the Ontario Professional Engineers Act and that, as such, I have been retained or employed by the Owner of the Property to undertake/supervise the clean-up of the Property and that this clean-up has been completed in accordance with relevant legislation, regulations and MOEE guidelines. I also certify that I am satisfied that sufficient work has been done to demonstrate that the clean-up has been completed in accordance with MOEE guidelines for the land uses set out in Box 2 above. I am not aware of any environmental conditions affecting the property which would interfere with its safe use for the land use category set out in Box 2 above. I acknowledge that public authorities and future owners, occupants, and others may rely on this Notice.

(**) Please affix stamp of P. Eng.

Name (please print)	Signature	Date
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7. Acknowledgement of Receipt

The MOEE acknowledges receipt of this Notice of Clean-up. The MOEE has not reviewed, considered or commented on the content of the report(s) cited in Box (1) above of this Notice of Clean-up. The MOEE has not supervised the clean-up work undertaken at the Property and does not assume any responsibility or liability for the clean-up of the Property or for notifying future owners or present or future occupants of the Property of the clean-up. Proof of the quality of the Property and of the effectiveness of the clean-up undertaken at the Property is the responsibility of the Owner of the Property and subsequent owners. Any persons intending to purchase or occupy the Property must assess for themselves the extent of responsibility and liability that may arise from taking ownership or from occupying the Property. [Where the guideline provides that a Certificate of Prohibition must be registered on title pursuant to a Director's order, acknowledgement of receipt of this Notice will not be issued until such time as the Director is provided with a duplicate copy of the Certificate and evidence that the Certificate has been registered on title.]

Acknowledgement of Receipt	Date
----------------------------	------

O R D E R

TO: [Owner of the Property]

PART 1 LEGAL AUTHORITY AND REASONS

- 1.1 Pursuant to subsection 1(1) of the *Environmental Protection Act*, R.S.O. 1990, c.E. 19, as amended (EPA), "contaminant" means any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that may cause an adverse effect.
- 1.2 Subsection 18(1)3 of the EPA provides that the Director may, by order, require a person who owns or owned or who has or had management or control of an undertaking or property to implement procedures specified in the order.
- 1.3 Subsection 18(2) of the EPA provides that the Director may make an order under subsection 18(1) where the Director is of the opinion, based on reasonable and probable grounds,
 - (a) that the nature of the undertaking or of anything on or in the property is such that if a contaminant is discharged into the natural environment from the undertaking or from or on the property, the contaminant will result or is likely to result in an effect mentioned in the definition of "contaminant" in subsection 1(1); and
 - (b) that the requirements specified in the order are necessary or advisable so as,
 - (i) to prevent or reduce the risk of the discharge of the contaminant into the natural environment from the undertaking or from or on the property, or
 - (ii) to prevent, decrease or eliminate an effect mentioned in the definition of "contaminant" in subsection 1(1) that will result or that is likely to result from the discharge of the contaminant into the natural environment from the undertaking or from or on the property.
- 1.4 Subsection 197(1) of the EPA provides that a person who has authority under the EPA to make an order or decision affecting real property also has authority to prohibit any person with an interest in the property from dealing with the property in any way without first giving a copy of the order or decision to each person acquiring an interest in the property as a result of the dealing.
- 1.5 Subsection 197(2) of the EPA provides that a certificate setting out such prohibition may be registered in the proper land registry office on the title of the real property to which the prohibition relates, if the certificate is in the prescribed form, is signed by the Director and is accompanied by a registrable description of the property.
- 1.6 _____ is the registered owner of the following parcel of land
(Property):

- 1.7 In this order,
- (a) "Surface soils" means soils which lie at the surface or within 1.5 meters below the surface.
 - (b) "Sub-surface soils" means soils which lie at more than 1.5 meters of the surface.
- 1.8 The owner [the Owner] has submitted a "Notice of Clean-up", attached hereto as Schedule "A", as provided for under the Ministry of Environment and Energy's Guideline for the Clean-up of Contaminated Sites in Ontario, [date Guideline published] ("Guideline").

(Conditions 1.9a, or 1.9b, or 1.9c may apply in the alternative depending on the type of clean-up undertaken)

- 1.9a The "Notice of Clean-up" states that [the Owner] has undertaken and completed a "Stratified Depth Clean-up" of the Property in accordance with the Guideline such that sub-surface soils contain contaminants at levels that exceed the Soil Clean-up Criteria specified in Tables A or B but that are less than the Soil Clean-up Criteria specified in Tables C or D.
- 1.9b The "Notice of Clean-up" states that [the Owner] has undertaken and completed a clean-up of the Property in accordance with the Guideline such that the groundwater at the property exceeds the Groundwater Criteria specified in Table A but is less than the Groundwater Criteria specified in Table B.
- 1.9c The "Notice of Clean-up" states that [the Owner] has undertaken and completed a clean-up of the Property in accordance with the Guideline. The clean-up is based on a "Site Specific Risk Assessment" described in the report entitled "*{insert title of report(s)}*" and/or involves risk management measures or engineering controls.

(Conditions 1.10a, or 1.10b, or 1.10c may apply in the alternative depending on the type of clean-up undertaken)

- 1.10a The Guideline provides that where a "Stratified Depth Clean-up" is undertaken, the soils at depth should always remain at depth. If at some future date the sub-surface soils are brought to and left at surface, further clean-up will be required.
- 1.10b The Guideline provides that where groundwater at the Property has been cleaned up to levels that exceed the Groundwater Criteria specified in Table A, but are less than the Groundwater Criteria in Table B, the groundwater will be of a quality that is unsuitable for consumption or other potable purposes.
- 1.10c The Guideline provides that a "Site Specific Risk Assessment" (SSRA) incorporates site specific data including site conditions and receptor characteristics in estimating whether there is an unacceptable risk to human health and the natural environment from chemicals at a property. Following the clean-up, the Property shall be managed such that the site conditions and receptor characteristics remain consistent with the findings of the pathways analysis and the risk management measures and/or controls described in the report(s).

PART 2 PROHIBITION AND REGISTRATION ON TITLE

(Conditions 2.1a, or 2.1b, or 2.1c may apply in the alternative depending on the type of clean-up undertaken)

- 2.1a Where any activity causes sub-surface soils at the Property to be disturbed with the result that sub-surface soils are brought to within 1.5 meters of the surface, [the owner] shall manage the sub-surface soils that do not meet the criteria in Table A or B and that have been disturbed to ensure that none of this soil is left within 1.5 metres of the surface.

- 2.1b Given that groundwater at the Property exceeds the Groundwater Criteria in Table A of the Guideline, the groundwater shall not be used for consumption and/or other potable purposes.
- 2.1c Where any soils at the Property have been cleaned up in accordance with a "Site Specific Risk Assessment", the property shall be managed in a manner that is consistent with the findings of the pathways analysis and the risk management measures and/or controls described in the report(s).
- 2.2 Pursuant to subsection 197(1) of the EPA, I prohibit any dealing with the Property in any way without first giving a copy of this order to each person acquiring an interest in the Property.
- 2.3 Within _____ days of the date this order was issued, register the Certificate of Prohibition accompanying this order on title to the Property in the appropriate Land Registry Office.
- 2.4 Immediately after registration of the Certificate of Prohibition provide a duplicate copy of the certificate with registration particulars to the Director.

PART 3 GENERAL

- 3.1 The requirements of this order are severable. If any requirement of this order or the application of any requirement to any circumstance is held invalid, the application of such requirement to other circumstances and the remainder of the order shall not be affected thereby.
- 3.2 Any request to change a requirement in this order shall be made in writing to the Director with reasons for the request, at least 14 days prior to any compliance date for that requirement.
- 3.3 The requirements of this order are minimum requirements only and do not relieve you from:
 - 3.3.1 complying with any other applicable order, statute, regulation, municipal, provincial or federal law; and
 - 3.3.2 obtaining any approvals or consents not specified in this order.
- 3.4 Notwithstanding the issuance of this order, further or other orders may be issued in accordance with the legislation as circumstances require.
- 3.5 Subsection 19(1) of the EPA provides that an order of the Director is binding upon the successor or assignee of the person to whom it is directed.
- 3.6 Subsection 186(2) of the EPA provides that non-compliance with the requirements of this order constitutes an offence.

**Form 1
Formule 1**

*Environmental Protection Act
Loi sur la protection de l'environnement*



Province of
Ontario
Ontario - L'Ontario

Document General
Form 4 — Land Registration Reform Act

Document général
Formula 4 — Loi portant réforme de
l'enregistrement immobilier

D

<p>FOR OFFICE USE ONLY/USAGE INTERNE</p> <p>New Property Identifiers Nouvelles cotés foncières: Additional See Schedule Supplément en annexe</p> <p>Executions Actes d'exécution: Additional See Schedule Supplément en annexe</p>	<p>(1) Registry Enregistre- ment des actes <input type="checkbox"/> Land Titles Enregistrement des droits immobiliers <input type="checkbox"/></p> <p>(2) Page 1 of/de Pages</p> <p>(3) Property Identifiers(s) Cotés Foncières Block Pièce <input type="checkbox"/> Property Unité foncière <input type="checkbox"/> Additional: See Schedule Supplément en annexe <input type="checkbox"/></p> <p>(4) Nature of Document Nature du document Certificate of Prohibition Certificat d'interdiction</p> <p>(5) Consideration Contrepartie N/A ----- S/O Dollars \$N/A --- S/O\$</p> <p>(6) Description</p>													
<p>(7) This Document Contains: Contenu du document: (a) Redescription New Easement Plan/Sketch <input type="checkbox"/> (b) Schedule for: Annexe <input type="checkbox"/> Additional Description Description <input type="checkbox"/> Parties Autres parties <input type="checkbox"/> Other Divers <input checked="" type="checkbox"/></p> <p>(8) This Document provides as follows: Termes du document:</p> <p>See Schedule Voir annexe</p>														
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Schedule/Annexe



Form 5 — Land Registration Reform Act
Formula 5 — Loi portant réforme de l'enregistrement immobilier

Page _____

S

Additional Property Identifier(s) and/or Other Information
Cote(s) foncière(s) additionnelle(s) et renseignements supplémentaires

Certificate of Prohibition

s.197(2) Environmental Protection Act

This is to certify that pursuant to an order (or decision) of
.....
dated , 19....
relating to

.....
(insert brief description, e.g.
waste disposal site, contaminated land,
sewage works, etc.)

the following person(s)

.....

.....
(set out names)

are prohibited from dealing with the property described in Box 6 without first giving a copy of the order (or decision) to each person acquiring an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, the prohibition applies to each person who, subsequent to the registration of this certificate, acquires an interest in the property.

Certificat d'interdiction

Par. 197 (2) - Loi sur la protection de l'environnement

Il est attesté par la présente que, conformément à un arrêté (ou une décision) de
daté(e) du 19..., relativement à

.....
(insérer une brève description, par ex.
lieu d'élimination des déchets, bien-fonds contaminé, station d'épuration des eaux d'égout, etc.),

il est interdit aux personnes suivantes

.....
(indiquer les noms)

d'effectuer une opération portant sur le bien décrit dans la case 6 à moins de remettre d'abord une copie de l'arrêté (ou de la décision) aux personnes qui acquièrent un intérêt sur le bien par suite de cette opération.

En vertu du paragraphe 197 (3) de la Loi sur la protection de l'environnement, l'interdiction s'applique aux personnes qui, après l'enregistrement du certificat, acquièrent un intérêt sur le bien.

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Form 2
Formulaire 2Environmental Protection Act
Loi sur la protection de l'environnement

 Province of Ontario		Document General Form 4 — Land Registration Reform Act			Document général Formulaire 4 — Loi portant réforme de l'enregistrement immobilier			
FOR OFFICE USE ONLY/USAGE INTERNE New Property Identifiers Nouvelles coûtes foncières Executions Actes d'exécution		(1) Registry Enregistrement des actes <input type="checkbox"/> (3) Property Identifiers(s) Coûtes foncières <input type="checkbox"/> (4) Nature of Document Nature du document <input type="checkbox"/> (5) Consideration Contrepartie <input type="checkbox"/> (6) Description		Land Titles Enregistrement des droits immobiliers <input type="checkbox"/> (2) Page 1 of 7 de Pages Property Unité foncière <input type="checkbox"/> Additional: See Schedule Supplément en annexe <input type="checkbox"/> Certificate of Withdrawal of Prohibition Certificat de levée d'interdiction		Additional: See Schedule Supplément en annexe <input type="checkbox"/> N/A <input type="checkbox"/> S/O Dollars \$N/A --- S/O \$ Additional: See Schedule Supplément en annexe <input type="checkbox"/>		
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				Registration Fee Droits d'enregistrement				
				Total				



Schedule/Annexe
Form 5 — Land Registration Reform Act
Formula 5 — Loi portant réforme de l'enregistrement immobilier

S

Page _____

Additional Property Identifier(s) and/or Other Information
 Côte(s) foncières additionnelle(s) et renseignements supplémentaires

**Certificate of Withdrawal
 of Prohibition**

s. 197(5) Environmental Protection Act

This is to certify that the prohibition against certain dealings with the property described in Box 6 is withdrawn.

The prohibition was issued pursuant to an order (or decision) of

dated , 19..., and a certificate of the prohibition was registered as Instrument No., on the day of, 19..., in the Land Registry Office for the Registry (or Land Titles) Division of

Certificat de levée d'interdiction

Par. 197 (5) - Loi sur la protection de l'environnement

Il est attesté par la présente que l'interdiction à l'égard de certaines opérations portant sur le bien décrit dans la case 6 est levée.

L'interdiction a été décernée conformément à un arrêté (ou une décision) de

daté(e) du 19..., et un certificat d'interdiction a été enregistré sous l'acte numéro

le 19..., au bureau d'enregistrement immobilier de la division d'enregistrement des actes (ou d'enregistrement des droits immobiliers) de

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Proposed program selected this
book for its use in all their subjects
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